
Request No. AG-4-22 (Gas)
Please provide a copy of the Company's most recent long range supply forecast.

Response:
Please see the attached copy of the Company's Integrated Gas Resource Plan filed May 1, 2000.

Person Responsible: Mark H. Collin

Unitil
Fitchburg Gas and
Electric Light Company

FITCHBURG GAS AND ELECTRIC LIGHT COMPANY

A **Unitil** *Company*

2000 Integrated Gas Resource Plan

Filed with the
Massachusetts Department of Telecommunications and Energy
May 1st, 2000

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I. PROCEDURAL ISSUES

A. RETAIL CHOICE EFFORTS

On February 25th, 2000 FG&E submitted terms and conditions for retail choice based on the work of the Massachusetts Gas Unbundling Collaborative (MGUC). The Company is awaiting Department approval for this tariff, and is preparing to implement the systems required to operate under the requirements of the new tariff in the interim.

In addition, the Company has been offering transportation service under its Interim Firm Transportation (IFT) Tariff since 10/1/99. A number of eligible firm customers have signed onto this tariff, and have been taking supply service from a third party since October 1999 under this tariff. The Company's experience operating this tariff has been a positive one, both from a customer and from a supplier perspective. Hence, FG&E is moving into the next stage of its retail access efforts with confidence.

B. IMPACT OF RETAIL CHOICE EFFORTS ON LONG RANGE FORECASTS

This Integrated Resource Plan (IRP) has been prepared in parallel with the Company's efforts to offer retail choice. Resource planning and retail choice touch on many of the same issues, and each effort requires significant resources. FG&E prepared this filing with the intent of satisfying the Department's requirements for long range forecasts while not detracting from its retail choice efforts.

FG&E recognizes that Massachusetts LDCs do not offer full retail access, and that vigorous retail competition may not develop for several years. During the transition period to a competitive supplier service, FG&E must plan for and procure supplies for its remaining sales customers. Even in a fully competitive environment, LDC's are likely to remain responsible for procuring pipeline capacity for use by non-utility suppliers until a competitive market exists for such capacity.

Given that FG&E is in midst of offering retail choice, it has prepared this forecast and supply plan consistent with Department policy. In the future, however, FG&E believes that the Department should structure forecasts and supply plan requirements so as to reflect the LDCs' reduced role in providing supply.

C. *OVERVIEW OF FG&E'S INTEGRATED RESOURCE PLAN 2000-2004*

FG&E's Integrated Resource Plan (IRP) for the 2000 to 2004 period includes the Company's sendout requirements forecast, current supply portfolio, gas transportation arrangements, and an analysis of the Company's supply portfolio under differing design conditions. Rather than present a definitive supply acquisition plan over the 2000-2004 planning horizon, The Company identified areas in which future supply decisions must be made in order to ensure system reliability and to ensure that total projected requirements for the FG&E service territory are met. Future sendout requirements will be met through competitive market supplies DSM or energy efficiency rescues or through alternate sources as dictated by future regulatory directives.

Existing agreements include pipeline supplies, underground storage, interstate pipeline transportation and local production facilities. FG&E plans to continue or extend its local production agreements. These local facilities include a liquefied natural gas (LNG) storage/vaporization facility and a propane/air facility that will continue to provide peaking supply to maintain system reliability. The Company's gas supplies are acquired in the unregulated gas supply marketplace from a diverse group of vendors including marketers and producer affiliates. Underground storage and interstate transportation services are provided by FERC regulated utilities. The Tennessee Gas Pipeline Company (TGP) currently provides interstate pipeline transportation to the FG&E citygate. DSM savings will be generated in accordance with the DSM plan to be submitted for Department approval on or before 5/15/2000.

In 1999, FG&E extended six of its transportation contracts through March 31st, 2004 in order to ensure that it could meet the obligations of its firm supply customers. Furthermore, FG&E is currently in the process of extending its storage contract with Consolidated Natural Gas. The Company has chosen to contract for liquid and vapor supplies on a seasonal basis as long term supply contracts expire. These contracting decisions result in a portfolio that is flexible enough to adjust for future DSM savings and to allow the Company to exit the supply business within the forecast period while maintaining the Company's ability to reliably and economically serve its firm customers. The Company's contracting process will be addressed in more detail later in this IRP.

II. REQUIREMENTS ASSESSMENT

The forecast of FG&E's firm sendout requirements over the long-term planning horizon is an integral part of the development of the IRP. This portion of the IRP describes the Company's forecast methodology, assumptions and results over the five year planning horizon covering the gas years of 1999/2000 through 2003/2004. The Requirements Assessment is organized into the following sections:

- First, an overview of the forecasting process is presented in the Forecast Methodology and Results section.
- The Data Description section identifies the sources of data used to develop the forecast, summarizes the data in terms of growth rates and describes any adjustments made.
- The next section, Weather Normalization, describes the process used to weather normalize historic firm sales by customer class and company-level firm sendout.
- The Customer Class Forecasts section details the forecasting methodology, equations, results and ex-post analysis for each customer class. Expected results of the company's gas marketing efforts are also added to class sales forecasts.
- The Firm Transport section describes three scenarios used by the Company to identify the loads likely to migrate to a third party supplier.
- The Normal Year Sendout Forecast section discusses the calculation of the normal firm sendout forecast.
- The Planning Standards and Design Forecast section presents the Company's planning standards and design year and design peak day forecasts.
- The final section, Compliance with DTE 98-55 Order, lists specific directives relating to the Company's forecast methodology that were ordered in FG&E's last Gas IRP filing and discusses how they have been addressed.

In addition to the text and tables included in this section, the standard EFSC tables are included in the Appendix along with the statistical documentation and complete forecast results.

A. FORECAST METHODOLOGY AND RESULTS

1. Methodology Overview

FG&E has developed a long term firm gas sales and sendout forecasting process that takes into account the major factors influencing gas sales in the Company's service territory and addresses the concerns raised by the Department in FG&E's last Gas IRP (DTE 98-55).

The forecasting process begins with the development of the demand forecast, which is developed at the customer class level. The demand forecast is adjusted to derive the firm throughput forecast. Scenario assumptions are made about Firm Transport (FT) service and FT is netted from firm throughput to yield the normal sendout forecast. FG&E also applies its planning standards to develop design condition forecasts of throughput, FT and firm sendout.

The demand forecasting process involves data collection, weather-normalization of historic sales data, and forecasting customers and sales per customer (or class sales) by customer class. Class sales and customer forecasts were based on separate regression equations for each class. In total six equations were estimated, one for customers in each class and one for sales per customer (or class sales) in each class. The expected results of a gas marketing effort recently begun were added to the class sales forecasts. The sum of class level sales forecasts is the total company firm sales forecast.

Total firm sales were adjusted to derive total firm throughput, which includes both firm transport and firm sendout load. The historic relationship between firm throughput and firm sales was projected forward on a statistical basis and applied to the firm sales forecast to project future firm throughput. The difference between firm sales and firm throughput represents billing cycle adjustments, lost and unaccounted for gas and company use.

FG&E has limited experience with FT service and therefore has established three migration scenarios to demonstrate its ability to meet supply obligations and to optimize supply costs under varying outcomes of customer migration. The Base Scenario reflects the company's expectation of customer migration over the forecast period; the two other scenarios represent extreme scenarios, one with extremely high migration and one with extremely low migration. The normal sendout forecast associated with each FT scenario was calculated by subtracting FT from the firm throughput forecast.

The Company established its planning standards by first calculated the heating degree-days (HDD) associated with design cold weather conditions of varying probabilities of occurrence (1 in 30, 1 in 50, and 1 in 100). Base load and weather-sensitive components of firm sendout were then identified and the responsiveness of weather-sensitive load was determined. The HDD associated with the different design conditions were applied to these factors to produce forecasts of firm sendout associated with each design condition. The Company analyzed the incremental costs of supplying the additional firm sendout associated with higher design standards and balanced these against the declining likelihood of occurrence to establish the design criteria for the planning standards.

2. Summary of Forecast Results

The forecast projects sales to firm customers to increase by 0.63% annually over the forecast period under static or "business as usual" conditions. This forecast has been developed rigorously at the customer class level and has been termed the "core sales" forecast. FG&E recently implemented a gas marketing effort designed to retain residential customers and attract new commercial and industrial customers. The sales expected from this effort have been added to the core sales forecast to produce the demand forecast. The demand forecast, including gas marketing sales is projected to increase at 3.21% annually over the forecast period. Normal year firm throughput is projected to grow at an annual rate of 4.52% over the forecast period. Under FG&E's Base FT Scenario, firm sendout is projected to decline by 3.22% over the forecast period. These results are developed fully throughout the remainder of this section.

Table 2.1: Summary Forecast Results

MMBTU	*Core Firm Sales*	*Gas Mkt. Sales*	*Demand Forecast*	*Firm Throughput*	*Firm Transport*	*Firm Sendout*
1994	2,288,243	0	2,288,243	2,374,182	0	2,374,182
1995	2,302,445	0	2,302,445	2,374,177	0	2,374,177
1996	2,384,478	0	2,384,478	2,398,923	0	2,398,923
1997	2,407,382	0	2,407,382	2,466,916	0	2,466,916
1998	2,461,405	0	2,461,405	2,410,005	0	2,410,005
1999	2,380,386	0	2,380,386	2,454,633	77,565	2,377,069
2000	2,365,636	50,403	2,416,038	2,455,273	350,265	2,105,008
2001	2,374,897	129,005	2,503,902	2,534,904	488,370	2,046,534
2002	2,398,547	212,449	2,610,996	2,631,204	638,483	1,992,720
2003	2,426,284	276,318	2,702,602	2,709,098	792,840	1,916,258
2004	2,456,661	330,445	2,787,106	2,779,839	952,535	1,827,304
5 Year Compound Annual Growth Rates						
1994-99	0.79%	N/A	0.79%	0.67%	N/A	0.02%
1999-04	0.63%	N/A	3.21%	2.52%	N/A	-5.12%

B. DATA DESCRIPTION

The demand forecasting process begins with data collection. Historic data were collected from 1983 through 1999; forecast data were obtained for the period 2000 through 2004. Broadly, three types of data were incorporated into the forecasts: customer consumption data, weather data and economic/demographic data. Customer consumption data were taken from company records and include historic firm sales and number of customers by customer class, historic firm sendout and firm transport data, and average price data by customer type. Weather data were taken from the Worcester-Bedford weather database, the database approved for use in FG&E's last two Gas IRP filings. Historic and forecast data of various economic and demographic variables were obtained from WEFA, Inc., an economic consulting firm.

Customer consumption data were adjusted to account for changes in the Company's rate design and for the recent availability of Firm Transport (FT) service. Demand-side management (DSM) programs have not yet been made available to FG&E gas customers, therefore no adjustments to historic sales data were required. [As indicated earlier, FG&E will file for approval of a DMS plan on or before May 15, 2000. The future savings from this plan will be reflected through reduced supply commitments. Sufficient flexibility has been built into the supply plan to account for future DSM savings.] In December 1998, FG&E's gas division began operating under a new rate design. Prior to the rate change, FG&E offered firm service to three customer rate classes: Residential (GR), General Service Heating Only (GS1) and General Service Heating and Other (GS2). Effective with the new rate design, FG&E now offers firm service to customers under 10 rate classes. Four of these are for residential customers, and six are for general service customers. In order to provide a reliable and consistent historic database, consumption data under the new rate design from the period December 1998 through December 1999 were converted into the old rate design. The conversion was based upon the allocation of sales and customers between the old and new rate designs as shown in workpapers prepared by Management Application Consulting, Inc. and filed during the rate case (see DTE 98-51, Volume II, Rate Design Workpapers, pp. 34-37). The conversion factors are included on pages 12-18 of the Appendix.

In November 1999, FG&E began offering FT service to its largest customers. Deliveries to FT customers during November and December 1999 have been added back to firm sales in order to maintain a consistent historical database. Thus the "firm sales" discussed and reported herein reflect total firm deliveries to customers – firm sales plus firm transport. Prior to November 1999, firm deliveries were equal to firm sales. Throughout the presentation of the class forecasts, the term "sales" has been used for simplicity.

The Company has continued to use weather data from the Worcester-Bedford database, which was approved by the Department in the Company's previous two Gas IRP filings (see Orders in DPU 94-140 and DTE 98-55). The Worcester-Bedford database contains daily heating degree day (HDD) data from the period 11/01/1964 to present, and is updated regularly by Weather Services, Inc. The HDD are calculated from a base of 65 degrees. This database provides FG&E with 35 years of historic weather data for use in preparing its long term sales and sendout forecasts. The weather data have been used to normalize historic class sales before they were modeled with regression equations. The weather data were also used to normalize company sendout, and to establish the Company's planning standards and design year sendout and peak day requirements.

FG&E has purchased forecast data that provide key measures of economic activity and demographic factors that might influence customer consumption behavior in the service territory from WEFA, Inc. The data contain annual histories from 1983 through 1999, and annual forecasts from 2000 through 2004. The data include fuel prices, employment and income, retail sales and population and housing statistics specific to Worcester County, the Boston PMSA or the commonwealth of Massachusetts. WEFA also provided forecasts of the Consumer Price Index (CPI) and Producer Price Index (PPI). The CPI was used to convert nominal dollar values related to residential customers to real dollars, and the PPI was used to convert nominal dollar values related to commercial and industrial customers to real dollars. The Table 2.1 below summarizes the economic and demographic data indicating code names used in regression equations, the inflation measure was used to convert dollar values to real values and which geographical region the data are specific to.

Table 2.2: Economic and Demographic Variables Provided by WEFA, Inc.

Code Name	*Variable Description*	*Inflation*	*Region*
RGAS	Real Price of Gas to Residential Customers	CPI	FG&E/ Mass
CGAS	Real Price of Gas to Residential Customers	PPI	FG&E/ Mass
IGAS	Real Price of Gas to Residential Customers	PPI	FG&E/ Mass
HHOIL	Real Price of No. 2 Home Heating Oil	CPI	Mass
RESOIL	Real Price of No. 6 Residual Fuel Oil	PPI	Mass
POP	Population	N/A	Worcester
MFGEM	Manufacturing Employment	N/A	Worcester
SVCEM	Service Sector Employment	N/A	Worcester
INCPC	Real Income Per Capita	CPI	Worcester
HSTOCK	Housing Stock	N/A	Worcester
HHSIZE	Household Size	N/A	Worcester
HSTART	Housing Starts	N/A	Boston PMSA
RETSLS	Real Retail Sales	PPI	Mass

The natural gas price data used in the demand forecasts is comprised of a hybrid of historic company data and price forecasts prepared by WEFA. The historic natural gas price data are actual average revenue by sector (residential, commercial and industrial) over the historic period. The forecast price data applies the growth rates of WEFA's forecasts for residential, commercial and industrial natural gas prices for Massachusetts to the company-specific historic prices.

C. WEATHER NORMALIZATION

Gas sales and sendout requirements are heavily dependent upon weather conditions, which can vary severely on a daily, monthly and annual basis. Thus, historic monthly sales and sendout are standardized (i.e., weather normalized) for aberrations in weather conditions before being used in long term gas forecasting and supply planning. The weather normalization process is described below.

Before class sales can be weather normalized, historic calendar based heating degree-day (HDD) data need to be recast to reflect the timing of customer billing cycles. At FG&E, customer meters are read at a steady rate each working day of the month. In prior filings, FG&E had taken a simple average of current month and prior month HDD to capture the billing cycle effect because metered sales in the current month reflect actual consumption that occurred during both the current and prior months. In this filing, FG&E has applied a more accurate method of adjusting calendar HDD data to better reflect the timing of the billing cycle.

When meters are read steadily over the course of the month, consumption (and thus HDD) during the early days of the prior month and late days of the current month have little impact on sales recorded in the current month. In contrast, consumption during the late days in the prior month and the early days in the current month have a significant impact on sales recorded in the current month. An illustration demonstrating this effect has been included on page 19 of the Appendix. The illustration shows the period of consumption associated with meter readings each day of the month. The days of consumption that impact metered sales in the billing month were summed and used to develop a weighting distribution to attribute calendar consumption to billing cycle data[1].

Historic HDD data from December 1982 through December 1999 were adjusted for billing cycle by applying the weighting distribution discussed above to daily HDD data. In

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[1] The weighting distribution allocates calendar HDD over the course of the month as follows: Day one: 97% to the current month, 3% to the subsequent month. Day two: 94% to the current month, 6% to the subsequent month, and so on. The prior method of averaging current and prior monthly HDD had the effect of weighting HDD observed each day 50% to the current month and 50% to the subsequent month.

addition, the weighting distribution was applied to the average daily HDD observed over the 35-year history of the weather database to establish normal billing cycle HDD. The difference between actual and normal billing-cycle-adjusted HDD each month feeds into the weather normalization calculations. Class sales were normalized by identifying the weather-sensitive portion of sales for each class and calculating how much more or less each class would have consumed had HDD been normal.

The calculation was performed as follows. Average use per customer in each class was calculated each month. Average base load (not sensitive to weather) per customer in each class was taken as the lowest monthly average use over the course of the year[2]. Average weather-sensitive use per customer was calculated by subtracting base load use per customer from the average use per customer. Next, weather-sensitive use per customer per HDD was computed each month by dividing average weather-sensitive use per customer by actual HDD. The weather-sensitive use per customer per HDD was then multiplied by the difference between the actual HDD and normal HDD to produce the normalization adjustment per customer. The normalization adjustment per customer was then multiplied by the number of customers to produce the weather normalization adjustment each month. An example of the model used to normalize sales is included on page 20 of the Appendix.

Historic system sendout was weather normalized in a similar manner, using calendar based HDD data, rather than billing cycle adjusted HDD data. The other difference was that base load and weather-sensitive components for each historical month were estimated separately using regressions of actual daily sendout on daily HDD observed each month. These components are included on page 21 of the Appendix.

D. CUSTOMER CLASS FORECASTS

1. Introduction

Class sales and customer forecasts were based on separate econometric regression equations for each class. In total six equations were estimated, one for customers in each class and one for sales per customer (or class sales) in each class. The forecasting equations were estimated using historic annual calendar year data from 1983 through 1999. The equations were then applied to annual forecast data for the years 2000 through 2004 to compute the forecasts. An attempt was made to model sales per customer for each class. This was successfully done for the residential class, but not for the general service classes. Class sales for the residential class were calculated by multiplying the forecast of customers and the forecast of sales per customer. Class sales for the general service classes were forecast directly[3].

As appropriate, number of customers and sales by class were regressed against the economic and demographic variables discussed earlier in the Data Description section. In addition, occasional use was made of dummy variables, a trend variable, lagged dependent variables and an autocorrelation correction procedure. Weather data were not incorporated into the equations as all sales data were weather normalized prior to estimation. In addition, the use of annual data removed any issues related to seasonality.

All equations were estimated in logarithms using ordinary least squares (OLS). Parameter estimates of independent variables estimated in logarithms represent elasticities that relate percentage changes in the independent variables to percentage changes in the dependent variable. An effort was made to incorporate the real price of gas as an explanatory variable for each of the sales forecasts. This was successfully done for each class thereby providing estimates of price elasticity by class.

The process described thus far was used to produce the core customer class forecasts. That is, the sales and customers expected under "business as usual" conditions. FG&E recently began a gas marketing campaign designed to retain residential customers and add new commercial and industrial customers. The expected results from this initiative have been reported herein and added to the core forecasts for each customer class.

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[2] Base loads were almost always determined by usage in August.

[3] The consumption patterns of residential customers are relatively homogeneous, which imparts significance to the term "average use per customer." However, the consumption patterns of commercial and industrial customers are relatively heterogeneous

2. Modeling of Forecast Equations

Although the final equation in each of the six models is unique, the following general steps comprise a common modeling process used to develop each of the forecasts. These steps help to frame the discussion of each forecasting equation presented below and are intended to take some of the mystery out this relatively complicated process. The first two steps comprise the pre-estimation modeling building process. Steps three through six comprise an iterative trial and error process of model development and refinement. Step seven involves generation of the forecast and an ex post forecast, which is used to assess model robustness.

1. Determine "A Priori" Expectations. A priori expectations are theoretical relationships based in economic theory or upon professional judgement that one would expect to exist between certain variables. For example, as the price of gas rises, economic theory suggests that sales (quantity demanded) will fall. In this step, we ask which independent variables are likely to influence the dependent variable.

2. Examine Variable Correlation. The degree (0% to 100%) and direction (+/-) of correlation between potential independent variables and the dependent variable can indicate whether expected relationships are borne out in the data. Reviewing correlation among likely independent variables can also identify which variables might be collinear and suggest suitable proxy variables.

3. Specify and Estimate Initial Forecasting Equation. Using a priori expectations and information about variable correlation, propose an initial forecasting equation and estimate it in logarithms using ordinary least squares (OLS).

4. Connect Parameter Estimates to Theory. Verify that the sign and magnitude of parameter estimates of independent variables reflect plausible underlying theoretical relationships to the dependent variable. A strong statistical relationship may exist between two variables, but if the parameter estimates are in contrast to theory the independent variable must be rejected. This often signals missing relevant data. Sometimes statistical relationships

differ from a priori expectations yet still reflect plausible underlying relationships. This may lead to greater knowledge and expand our professional judgement.

5. Verify Statistical Tests. A number of statistical tests need to be satisfied before we can accept the parameter estimates of independent variables and rely upon a regression equation for forecasting purposes. These tests include the t-test, the F-test and the Durbin Watson test. These tests assess the statistical significance of the variables used, the explanatory power of the equation and properties of the residuals[4].

   The *t-statistic* of an independent variable tests whether the variable explains a significant level of variation in the dependent variable. Only independent variables with significant t-statistics are included in the final equations. The *F-statistic* is a joint t-test on all independent variables in a regression equation and thus tests how well a set of independent variables models a dependent variable. The F-statistic may be used to choose between alternative equations. The *R-squared* and *Adjusted R-squared* measure the overall goodness of fit a regression model[5]. The closer R-squared is to 1, the better the fit of the model. R-squared can also be used to choose between alternative models.

   When estimating regression equations that incorporate time series data, one must verify that residuals are not correlated over time. When residuals are correlated over time they are said to be autocorrelated or serially correlated. Serially correlation violates the OLS assumption of independent residuals. When statistical tests cannot rule out the presence of serial correlation, we reject the equation. The *Durbin-Watson statistic* (DW) is a generally accepted test for serial correlation among residuals. DW values at or near 2.0 reject the presence of serial correlation[6]. The DW is biased when lagged dependent variables are used as regressors, and an alternative test must be used. The *Breusch-Godfrey Serial Correlation LM Test* has been used as an alternative test when needed.

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[4] Residuals are the differences between the values of the dependent variable fitted by the regression model and the actual observed values of the dependent variable for each observation of the sample.

[5] Adding variables to a regression model, even arbitrarily, will automatically increase R-squared. The Adjusted R-squared accounts for the number of independent variables in a regression equation, and is preferred when more than one independent variable is modeled.

6. Re-specify the Forecasting Equation. Based upon the findings in Steps 4 and 5 above, review of a priori expectations and visual inspection of data and residuals, modify the forecasting equation by adding or removing independent variables and correcting for statistical problems as necessary. Re-estimate as in Step 3, and repeat as necessary until the criteria of Steps 5 and 4 have satisfactorily been met.

7. Generate Forecast and Ex-post Forecast. When each final equation was determined, the regression equation was applied to forecast values of the independent variables to generate the forecast. In addition, the sample was shortened by five years and an ex-post forecast of the past five years was estimated. Ex-post forecasts were compared to actual data to assess the robustness of the forecast equation.

3. Residential Class Forecast

The residential class sales forecast was based on separate forecasts of the number of residential customers and average use per customer. The class sales forecast was calculated as the product of the customer forecast and the use per customer forecast. In addition, residential sales expected from a recently implemented marketing effort have been added to the forecast.

The number of residential customers (RES_CUST) was expected to be primarily driven by changes in the population, housing stock and possibly employment levels. As more people live and work in the service territory, the numbers of customers would be expected to increase. Table 2.3, a correlation matrix, lists those variables considered significant in explaining the number of residential customers and their correlation to residential customers and each other. All variables are listed by code name and described in the Data Description section. Similar tables have been provided for each forecast that has been prepared.

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[6] Critical values of the DW statistic vary with sample size and with the number of independent variables. Critical values for rejecting the presence of serial correlation have been included for each equation.

Table 2.3: Variable Correlation to Number of Residential Customers

	RES_CUST	POP	HHSIZE	HSTART	HSTOCK	RGAS	HHOIL	INCPC	MFGEM	SVCEM	TREND
RES_CUST	1.00	-0.30	0.54	0.07	-0.45	0.35	0.35	-0.40	0.14	-0.53	-0.55
POP	-0.30	1.00	-0.94	-0.60	0.98	-0.93	-0.89	0.91	-0.79	0.96	0.95
HHSIZE	0.54	-0.94	1.00	0.62	-0.97	0.89	0.84	-0.87	0.81	-0.96	-0.99
HSTART	0.07	-0.60	0.62	1.00	-0.52	0.47	0.29	-0.36	0.68	-0.47	-0.53
HSTOCK	-0.45	0.98	-0.97	-0.52	1.00	-0.93	-0.92	0.94	-0.76	0.99	0.99
RGAS	0.35	-0.93	0.89	0.47	-0.93	1.00	0.90	-0.82	0.74	-0.92	-0.92
HHOIL	0.35	-0.89	0.84	0.29	-0.92	0.90	1.00	-0.84	0.75	-0.90	-0.89
INCPC	-0.40	0.91	-0.87	-0.36	0.94	-0.82	-0.84	1.00	-0.58	0.94	0.91
MFGEM	0.14	-0.79	0.81	0.68	-0.76	0.74	0.75	-0.58	1.00	-0.69	-0.76
SVCEM	-0.53	0.96	-0.96	-0.47	0.99	-0.92	-0.90	0.94	-0.69	1.00	0.99
TREND	-0.55	0.95	-0.99	-0.53	0.99	-0.92	-0.89	0.91	-0.76	0.99	1.00

Early attempts to regress RES_CUST against population and housing stock were rejected. This was because negative relationships were found to exist between these variables and RES_CUST. These relationships can be seen in the correlation matrix of Table 2.3. Household size explained significant variation in RES_CUST but was rejected because the result was counterintuitive. RES_CUST and household size both declined over the historic period. Household size is simply the relationship between population and the housing stock, which both increased over the historic period and both should have increased the number of customers. It was assumed that RES_CUST has been declining for reasons not represented in the available data. A trend variable was thus used to capture the effect of declining customers[7]. With the trend modeled, population and housing stock became significant contributors to the model.

Table 2.4 lists the final equation for number of residential customers and regression statistics. The complete regression output is presented on page 22 of the Appendix. Values of the DW statistic greater than the DW critical value reject the presence of serial correlation.

Table 2.4: Forecasting Equation for Number of Residential Customers

log(RES_CUST)= C +log(POP(-1)) +log(HSTOCK) +log(TREND) +DUM95					
Parameter Estimates and t-Statistics					
	C	POP(-1)	HSTOCK	TREND	DUM95
Elasticity	-1.425	1.196	0.596	-0.018	-0.012
T-Statistic	-1.471	8.193	2.611	-10.479	-2.068
Probability	0.1693	0.0000	0.0242	0.0000	0.0630
Summary Regression Statistics					
Adjusted R2	F-Statistic	F-Stat Prob	DW-Statistic	DW Crit Value	
0.955	81.16	0.0000	1.858	1.66	

Residential use per customer (RES_PER) was expected to be primarily driven by changes in the real price of gas, real personal income levels and household size. As the price of gas rises sales would be expected to fall, a negative relationship. Also, as people have increasing real incomes and larger homes, sales would be expected to rise, a positive relationship. Table 2.5 contains a correlation matrix listing those variables considered significant in explaining the residential consumption per customer and their correlation to RES_PER and each other. All variables are listed by code name and described in the Data Description section.

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[7] A trend or counter variable is a simple variable that equals one in the first observation, two in the second observation, and so on.

Table 2.5: Variable Correlation to Residential Use Per Customer

	RES_PER	RGAS	HHOIL	INCPC	HHSIZE	POP	MFGEM	SVCEM	HSTOCK	HSTART	TREND
RES_PER	1.00	0.21	0.25	-0.18	0.27	-0.32	0.65	-0.14	-0.23	0.48	-0.21
RGAS	0.21	1.00	0.90	-0.82	0.89	-0.93	0.74	-0.92	-0.93	0.47	-0.92
HHOIL	0.25	0.90	1.00	-0.84	0.84	-0.89	0.75	-0.90	-0.92	0.29	-0.89
INCPC	-0.18	-0.82	-0.84	1.00	-0.87	0.91	-0.58	0.94	0.94	-0.36	0.91
HHSIZE	0.27	0.89	0.84	-0.87	1.00	-0.94	0.81	-0.96	-0.97	0.62	-0.99
POP	-0.32	-0.93	-0.89	0.91	-0.94	1.00	-0.79	0.96	0.98	-0.60	0.95
MFGEM	0.65	0.74	0.75	-0.58	0.81	-0.79	1.00	-0.69	-0.76	0.68	-0.76
SVCEM	-0.14	-0.92	-0.90	0.94	-0.96	0.96	-0.69	1.00	0.99	-0.47	0.99
HSTOCK	-0.23	-0.93	-0.92	0.94	-0.97	0.98	-0.76	0.99	1.00	-0.52	0.99
HSTART	0.48	0.47	0.29	-0.36	0.62	-0.60	0.68	-0.47	-0.52	1.00	-0.53
TREND	-0.21	-0.92	-0.89	0.91	-0.99	0.95	-0.76	0.99	0.99	-0.53	1.00

The price of gas was found to be significant in explaining changes in RES_PER. However, personal income and household data were not. Rather, the level of manufacturing employment was found to be a very strong indicator of RES_PER. This may seem somewhat unlikely but the local economy of the service territory is very dependent upon manufacturing activity. In the final equation, manufacturing employment per capita was used along with the real price of gas. The residential demand for gas was found to be fairly price inelastic; the elasticity was estimated to be 0.10. Thus a one percent increase in real residential gas prices can be expected to reduce gas demanded by 0.1 percent.

Table 2.6 lists the final equation for residential use per customer and regression statistics. The complete regression output is presented on page 22 of the Appendix.

Table 2.6: Forecasting Equation for Residential Use Per Customer

log(RES_PER) = C + log(RGAS(-1)) + log(MFGEM/POP) + DUM96				
Parameter Estimates and t-Statistics				
	C	RGAS(-1)	MFGEM/POP	DUM96
Elasticity	8.062	-0.101	0.319	0.039
T-Statistic	31.83	-3.40	5.80	3.40
Probability	0.0000	0.0053	0.0000	0.0052
Summary Regression Statistics				
Adjusted R2	F-Statistic	F-Stat Prob	DW-Statistic	DW Crit Value
0.768	17.55	0.0001	2.047	1.43

The forecasts generated from the equations described above are summarized in Table 2.7 below. Table 2.7 shows the compound annual growth rate of the residential core customer and sales forecasts over the 5-year forecast period as well as the compound annual growth rates observed over the two prior 5-year periods. The historic period growth rates reflect normalized sales data.

Table 2.7: Residential Class Forecast Results

	Historical Period (1989-1994)	*Historical Period (1994-1999)*	*Forecast Period (1999-2004)*
Residential Class Core Forecast			
Customer Growth	-0.82%	-0.52%	-0.84%
Average Use	-0.21%	-0.12%	-0.28%
Total Class Sales	-1.03%	-0.65%	-1.12%

Results shown are 5-year compound annual growth rates.

As a test of how robust the forecasting equations are at predicting residential customers and use per customer, ex post forecasts were prepared. The sample data were shortened by 5 years and the equations were applied to estimate residential customers and use per customer during the past 5 years. This process is often referred to as backcasting. Table 2.8 compares the ex post forecast of residential customers and sales per customer to actual customers and sales per customer over the period. Over the 5 year period, residential customers were overestimated by 0.2% and use per customer was underestimated by 0.4%. Combining the forecasts to produce class sales yields a combined variance of –0.2% over the 5 year period.

Table 2.8: Residential Class Ex Post Forecast Analysis

	Residential Customers			Use Per Customer		
	Actual	*Ex Post*	*Var.*	*Actual*	*Ex Post*	*Var.*
1995	13,576	13,637	0.4%	954	953	-0.1%
1996	13,547	13,577	0.2%	992	992	0.0%
1997	13,599	13,525	-0.5%	959	961	0.2%
1998	13,541	13,553	0.1%	976	957	-1.9%
1999	13,483	13,566	0.6%	954	953	-0.1%
'95-'99	67,746	67,858	0.2%	967	963	-0.4%

The forecasts of core residential customers and sales discussed above reflect static state or "business as usual" conditions. Beginning in early 2000, FG&E began a marketing effort designed to retain residential customers. Expected results from this effort are presented in Table 2.9 below and have been added to the residential class sales forecast.

Table 2.9: Residential Class Forecast Summary Results

Therms	*Core Sales Forecast*	*Gas Marketing Forecast*	*Total Class Sales Forecast*
Total Residential Class Forecast			
1999	12,869,159	0	12,869,159
2000	12,719,470	108,853	12,828,323
2001	12,570,552	272,428	12,842,980
2002	12,445,231	438,581	12,883,812
2003	12,297,476	585,674	12,883,150
2004	12,164,127	723,911	12,888,038
1999-2004	-1.12%	N/A	0.03%

4. General Service GS1 (Heating Only) Class Forecast

The GS1 class forecasts included separate forecasts of the number of GS1 customers and of total class sales. An attempt was made to model GS1 use per customer. However, none of the economic or demographic variables available were statistically significant in relation to use per customer. Class level sales, however, were very responsive to the data and so were modeled instead of use per customer. Sales results expected from a recently implemented marketing effort have also been added to the forecast.

The number of GS1 customers (GS1_CUST) was expected to be related to the level of employment in the service sector and to population. GS1 customers are typically commercial in nature, and include many service sector businesses. Also, opportunities for commercial business tend to increase as population increases. Table 2.10 contains a correlation matrix of those variables potentially significant in explaining the number of GS1 customers and their correlation to GS1_CUST and to each other. All variables listed are identified by code name and described in the Data Description section

Table 2.10: Variable Correlation to Number of GS1 (Heating Only) Customers

	GS1_CUST	SVCEM	MFGEM	RETSLS	POP	CGAS	HHOIL	INCPC	TREND
GS1_CUST	1.00	0.87	-0.86	0.61	0.96	-0.76	-0.87	0.81	0.88
SVCEM	0.87	1.00	-0.69	0.80	0.96	-0.79	-0.90	0.94	0.99
MFGEM	-0.86	-0.69	1.00	-0.29	-0.79	0.61	0.75	-0.58	-0.76
RETSLS	0.61	0.80	-0.29	1.00	0.71	-0.55	-0.80	0.84	0.71
POP	0.96	0.96	-0.79	0.71	1.00	-0.79	-0.89	0.91	0.95
CGAS	-0.76	-0.79	0.61	-0.55	-0.79	1.00	0.73	-0.65	-0.79
HHOIL	-0.87	-0.90	0.75	-0.80	-0.89	0.73	1.00	-0.84	-0.89
INCPC	0.81	0.94	-0.58	0.84	0.91	-0.65	-0.84	1.00	0.91
TREND	0.88	0.99	-0.76	0.71	0.95	-0.79	-0.89	0.91	1.00

As can be seen in Table 2.10, service sector employment and population are highly correlated. When combined in a regression equation, they are nearly collinear, meaning they describe nearly the same variation in GS1_CUST. Since population provided better overall regression statistics, it was chosen and included in the final equation. A lagged dependent variable of GS1_CUST was also included to improve the character of the residuals. This was the only model that included a lagged dependent variable. Including a lagged dependent variable required running an alternative to the DW-Test for serial correlation. The Breusch-Godfrey Serial Correlation LM Test was run and indicated that serial correlation was not present. The output from this test is included on page 24 of the Appendix. Table 2.11 shows the final equation for number of GS1 customers and regression statistics. The complete regression output is presented on page 23 of the Appendix.

Table 2.11: Forecasting Equation for Number of GS1 (Heating Only) Customers

log(GS1_CUST) = C + log(GS1_CUST(-1)) + log(POP) + TREND				
Parameter Estimates and t-Statistics				
	C	GS1_CUST(-1)	POP	TREND
Elasticity	-12.642	0.519	2.441	-0.009
T-Statistic	-2.29	2.95	2.45	-2.09
Probability	0.0409	0.0121	0.0304	0.0583
Summary Regression Statistics				
Adjusted R2	F-Statistic	F-Stat Prob	B-G Serial Corr. LM Test	B-G Serial Corr. Prob
0.959	116.98	0.0000	0.0000	0.9980
The Breusch-Godfrey Serial Correlation LM Test Probability indicates the confidence with which the presence of serial correlation can be rejected.				

It was mentioned that GS1 use per customer (GS1_PER) did not respond to the variables available. The correlation matrix in Table 2.12 demonstrates this. Reading down the first column, one can see the correlations of all variables to GS1_PER are close to zero.

Table 2.12: Variable Correlation to GS1 (Heating Only) Use Per Customer

	GS1_PER	CGAS	HHOIL	RETSLS	INCPC	POP	SVCEM	MFGEM	TREND
GS1_PER	1.00	-0.10	0.02	0.14	0.13	-0.04	0.16	0.18	0.18
CGAS	-0.10	1.00	0.73	-0.55	-0.65	-0.79	-0.79	0.61	-0.79
HHOIL	0.02	0.73	1.00	-0.80	-0.84	-0.89	-0.90	0.75	-0.89
RETSLS	0.14	-0.55	-0.80	1.00	0.84	0.71	0.80	-0.29	0.71
INCPC	0.13	-0.65	-0.84	0.84	1.00	0.91	0.94	-0.58	0.91
POP	-0.04	-0.79	-0.89	0.71	0.91	1.00	0.96	-0.79	0.95
SVCEM	0.16	-0.79	-0.90	0.80	0.94	0.96	1.00	-0.69	0.99
MFGEM	0.18	0.61	0.75	-0.29	-0.58	-0.79	-0.69	1.00	-0.76
TREND	0.18	-0.79	-0.89	0.71	0.91	0.95	0.99	-0.76	1.00

GS1 class sales (GS1_SLS) were expected to be driven by changes in the real price of gas, by service sector employment and by real retail sales. A negative relation was expected between the price of gas and gas sales, while positive relationships were expected between GS1_SLS and service employment and retail sales. Table 2.13 contains a correlation matrix of those variables considered significant in explaining GS1 class sales. All variables are listed by code name and described in the Data Description section.

Table 2.13: Variable Correlation to GS1 (Heating Only) Class Sales

	GS1_SLS	CGAS	HHOIL	RETSLS	INCPC	POP	SVCEM	MFGEM	TREND
GS1_SLS	1.00	-0.82	-0.86	0.69	0.88	0.95	0.96	-0.76	0.97
CGAS	-0.82	1.00	0.73	-0.55	-0.65	-0.79	-0.79	0.61	-0.79
HHOIL	-0.86	0.73	1.00	-0.80	-0.84	-0.89	-0.90	0.75	-0.89
RETSLS	0.69	-0.55	-0.80	1.00	0.84	0.71	0.80	-0.29	0.71
INCPC	0.88	-0.65	-0.84	0.84	1.00	0.91	0.94	-0.58	0.91
POP	0.95	-0.79	-0.89	0.71	0.91	1.00	0.96	-0.79	0.95
SVCEM	0.96	-0.79	-0.90	0.80	0.94	0.96	1.00	-0.69	0.99
MFGEM	-0.76	0.61	0.75	-0.29	-0.58	-0.79	-0.69	1.00	-0.76
TREND	0.97	-0.79	-0.89	0.71	0.91	0.95	0.99	-0.76	1.00

The price of gas was found to be significant in explaining changes in GS1_SLS. Service employment and retail sales, along with population and income per capita were also very significant. Not surprisingly, given the correlations shown in Table 2.13, population and service employment are collinear and all of these variables are highly correlated. Service sector employment was chosen from this group of similar variables because it had the most theoretical meaning and produced the best regression statistics. The final equation regressed GS1_SLS against the real price of gas and service sector employment, along with a dummy variable. The GS1 class demand for gas was found to be fairly price inelastic, at 0.29. This supports theory suggesting that commercial customers are more responsive to energy prices than residential customers (recall residential price elasticity was estimated to be 0.10).

Table 2.14 lists the final equation for GS1 class sales and regression statistics. The complete regression output is presented on page 23 of the Appendix.

Table 2.14: Forecasting Equation for GS1 (Heating Only) Class Sales

$log(GS1\_SLS) = C + log(CGAS) + log(SVCEM) + DUM84$				
Parameter Estimates and t-Statistics				
	C	CGAS	SVCEM	DUM84
Elasticity	13.902	-0.291	0.593	-0.105
T-Statistic	16.01	-2.53	6.57	-3.06
Probability	0.0000	0.0253	0.0000	0.0091
Summary Regression Statistics				
Adjusted R2	F-Statistic	F-Stat Prob	DW-Statistic	DW Crit Value
0.950	101.99	0.0000	1.840	1.43

The forecasts generated from the equations described above are summarized in Table 2.15 below which shows the compound annual growth rate of the forecasts over the 5-year forecast period along with the compound annual growth rates observed over the two prior 5-year periods. The historic period growth rates reflect normalized sales data.

Table 2.15: GS1 (Heating Only) Class Forecast Results

	Historical Period (1989-1994)	*Historical Period (1994-1999)*	*Forecast Period (1999-2004)*
GS1 (Heating Only) Class Core Forecast			
Customer Growth	0.94%	0.77%	0.21%
Average Use	0.10%	1.72%	1.08%
Total Class Sales	1.04%	2.51%	1.30%

Results shown are 5-year compound annual growth rates. The class sales forecast was divided by the customer forecast to calculate the Average Use forecast.

To test the robustness of the forecasting equations, ex post forecasts were prepared by shortening the sample data and applying the equations to estimate the past 5 years. Table 2.16 compares the ex post forecast of GS1 customers and class sales to actual customers and class sales. Over the 5 year period, GS1 customers were overestimated by 0.6%. Class sales were underestimated by 0.9%, though this result was largely driven by the 1995 result. The variance in other years was close to zero.

Table 2.16: GS1 (Heating Only) Class Ex Post Forecast Analysis

	GS1 Customers			GS1 Class Sales		
	Actual	*Ex Post*	*Var.*	*Actual*	*Ex Post*	*Var.*
1995	944	943	-0.1%	4,946,702	4,746,299	-4.1%
1996	949	944	-0.5%	4,950,726	4,972,365	0.4%
1997	960	955	-0.5%	4,977,128	4,974,899	0.0%
1998	930	973	4.6%	4,931,480	4,951,915	0.4%
1999	984	982	-0.2%	5,005,053	4,952,049	-1.1%
'95-'99	4,767	4,797	0.6%	24,811,089	24,597,527	-0.9%

The forecast of core GS1 customers and sales discussed above reflects static state conditions. Beginning in early 2000, FG&E began a marketing effort to attract new commercial and industrial customers as well as to retain residential customers. Expected results from this effort upon the GS1 customers are presented in Table 2.17 below and added to the forecast.

Table 2.17: GS1 (Heating Only) Class Forecast Summary Results

Therms	*Core Sales Forecast*	*Gas Marketing Forecast*	*Total Class Sales Forecast*
Total GS1 (Heating Only) Class Forecast			
1999	5,005,053	0	5,005,053
2000	5,008,042	127,215	5,135,257
2001	5,073,230	328,114	5,401,344
2002	5,166,762	542,601	5,709,363
2003	5,249,449	709,348	5,958,797
2004	5,337,720	851,138	6,188,858
1999-2004	1.30%	N/A	4.34%

5. General Service GS2 (Heating and Other) Class Forecast

The GS2 class forecasts included separate forecasts of the number of GS2 customers and of total class sales. The GS2 class sales and sales per customer were highly correlated, at 99%. Attempts were made to model both GS2 use per customer and GS2 class sales; ultimately GS2 class sales were modeled because the forecasting equation produced better regression statistics. As with the other classes, sales results expected from the gas marketing effort have been added to the forecast of GS2 class sales.

The number of GS2 customers (GS2_CUST) was expected to be driven by employment levels, especially in the manufacturing sector. The GS2 class includes FG&E's largest industrial customers. Real income per capita and real retail sales were also considered likely indicators of GS2_CUST. Table 2.18 contains a correlation matrix of those variables thought to be significant in explaining the number of GS2 customers. All variables listed are identified by code name and described in the Data Description section

Table 2.18: Variable Correlation to Number of GS2 (Heating and Other) Customers

	GS2_CUST	MFGEM	SVCEM	RETSLS	POP	IGAS	RESOIL	INCPC	TREND
GS2_CUST	1.00	-0.31	0.58	0.41	0.54	-0.26	-0.33	0.72	0.59
MFGEM	-0.31	1.00	-0.69	-0.29	-0.79	0.67	0.81	-0.58	-0.76
SVCEM	0.58	-0.69	1.00	0.80	0.96	-0.82	-0.73	0.94	0.99
RETSLS	0.41	-0.29	0.80	1.00	0.71	-0.64	-0.63	0.84	0.71
POP	0.54	-0.79	0.96	0.71	1.00	-0.86	-0.83	0.91	0.95
IGAS	-0.26	0.67	-0.82	-0.64	-0.86	1.00	0.76	-0.72	-0.81
RESOIL	-0.33	0.81	-0.73	-0.63	-0.83	0.76	1.00	-0.73	-0.72
INCPC	0.72	-0.58	0.94	0.84	0.91	-0.72	-0.73	1.00	0.91
TREND	0.59	-0.76	0.99	0.71	0.95	-0.81	-0.72	0.91	1.00

As show in Table 2.18, manufacturing employment is negatively correlated with GS2_CUST. This relation was born out in the data and manufacturing employment was not useful in explaining GS2_CUST. Income per capita, retail sales, population and service sector employment, which are highly correlated with each other, were all significant indicators of GS2_CUST. Of these, real income per capita was chosen because it provided the best regression statistics. The real price of residual fuel oil, an alternative energy fuel, was also found to be significant and was added to the model. When the price of alternative fuels increases, customers can switch from those alternative fuels to gas. GS2 customers are generally responsive enough to fuel prices to make such changes. These variables were lagged in the final equation because it improved the character of the residuals.

Table 2.19 shows the final equation for number of GS2 customers and regression statistics. The complete regression output is presented on page 25 of the Appendix.

Table 2.19: Forecasting Equation for Number of GS2 (Heating and Other) Customers

log(GS2_CUST) = C + log(RESOIL(-1)) + log(INCPC(-1)) + DUM88				
Parameter Estimates and t-Statistics				
	C	RESOIL(-1)	INCPC(-1)	DUM88
Elasticity	2.246	0.068	0.336	-0.028
T-Statistic	4.89	5.17	8.03	-2.70
Probability	0.0004	0.0002	0.0000	0.0193
Summary Regression Statistics				
Adjusted R2	F-Statistic	F-Stat Prob	DW-Statistic	DW Crit Value
0.844	27.97	0.0000	1.777	1.44

GS2 class sales (GS2_SLS) were expected to be driven by changes in the real price of gas and by manufacturing employment. GS2 customers are FG&E's largest customers and they are best equipped to seek alternative fuels or to take non-firm gas in response to price increases. A negative relation was expected between the price and sales, while positive relationship was expected between manufacturing and sales. Table 2.20 lists those variables considered significant in explaining GS2 class sales and their correlation to GS2_SLS and each other. All variables are listed by code name and described in the Data Description section.

Table 2.20: Variable Correlation to GS2 (Heating and Other) Class Sales

	GS2_SLS	IGAS	RESOIL	MFGEM	SVCEM	POP	RETSLS	INCPC	TREND
GS2_SLS	1.00	-0.57	-0.38	-0.53	0.83	0.71	0.52	0.74	0.87
IGAS	-0.57	1.00	0.76	0.67	-0.82	-0.86	-0.64	-0.72	-0.81
RESOIL	-0.38	0.76	1.00	0.81	-0.73	-0.83	-0.63	-0.73	-0.72
MFGEM	-0.53	0.67	0.81	1.00	-0.69	-0.79	-0.29	-0.58	-0.76
SVCEM	0.83	-0.82	-0.73	-0.69	1.00	0.96	0.80	0.94	0.99
POP	0.71	-0.86	-0.83	-0.79	0.96	1.00	0.71	0.91	0.95
RETSLS	0.52	-0.64	-0.63	-0.29	0.80	0.71	1.00	0.84	0.71
INCPC	0.74	-0.72	-0.73	-0.58	0.94	0.91	0.84	1.00	0.91
TREND	0.87	-0.81	-0.72	-0.76	0.99	0.95	0.71	0.91	1.00

The price of gas was found to be significant in explaining changes in GS2_SLS. However, as was the case with GS2_CUST, manufacturing employment was not an indicator of GS2_SLS. The negative correlation shown in Table 2.20 between GS2_SLS and manufacturing employment (MFGEM) bears this out. Service sector employment, population and real income per capita were all significant variables although none could be modeled so as to provide acceptable regression statistics. Instead, a trend variable was used to pick up the steady growth in sales experienced by the GS2 class. The final equation included the lagged real price of gas, the trend variable and applied a correction procedure for first-order autocorrelation (AR). This was the only model requiring use of an autocorrelation correction. The GS2 class demand for gas was found to be fairly price elastic, at 0.58. This supports theory suggesting that industrial customers are most responsive to energy prices (residential price elasticity was 0.10, commercial was 0.29).

Table 2.21 lists the final equation for GS2 class sales and regression statistics. The complete regression output is presented on page 25 of the Appendix.

Table 2.21: Forecasting Equation for GS2 (Heating and Other) Class Sales

log(GS2_SLS) = C + log(IGAS(-1)) + TREND + AR(1)				
Parameter Estimates and t-Statistics				
	C	IGAS(-1)	TREND	AR(1)
Elasticity	17.215	-0.575	0.046	0.657
T-Statistic	13.26	-1.94	2.72	4.40
Probability	0.0000	0.0782	0.0200	0.0011
Summary Regression Statistics				
Adjusted R2	F-Statistic	F-Stat Prob	DW-Statistic	DW Crit Value
0.889	38.44	0.0000	1.843	1.46

The forecasts generated from the equations described above are summarized in Table 2.22 below which shows the compound annual growth rate of the forecasts over the 5-year forecast period along with the compound annual growth rates observed over the two prior 5-year periods. The historic period growth rates reflect normalized sales data.

Table 2.22: GS2 (Heating and Other) Class Forecast Results

	Historical Period (1989-1994)	*Historical Period (1994-1999)*	*Forecast Period (1999-2004)*
GS2 (Heating and Other) Class Core Forecast			
Customer Growth	-0.02%	1.06%	1.01%
Average Use	6.87%	1.72%	2.53%
Total Class Sales	6.85%	2.79%	3.57%

Results shown are 5-year compound annual growth rates. The class sales forecast was divided by the customer forecast to calculate the Average Use forecast.

To test robustness of the forecasting equations, ex post forecasts were prepared by shortening the sample data and applying the equations to backcast the past 5 years. Table 2.23 compares the ex post forecast of GS2 customers and class sales to actual customers and class sales. Over the 5-year period, GS2 customers were underestimated by 0.2% and class sales were overestimated by 1.7%.

Table 2.23: GS2 (Heating and Other) Class Ex Post Forecast Analysis

	GS2 Customers			GS2 Class Sales		
	Actual	*Ex Post*	*Var.*	*Actual*	*Ex Post*	*Var.*
1995	333	333	0.0%	5,130,070	5,074,744	-1.1%
1996	342	344	0.4%	5,456,556	5,730,986	5.0%
1997	352	349	-0.8%	6,059,491	6,207,303	2.4%
1998	363	360	-0.6%	6,331,408	6,146,397	-2.9%
1999	357	357	0.2%	5,929,650	6,242,260	5.3%
'95-'99	1,746	1,743	-0.2%	28,907,175	29,401,688	1.7%

The forecast of GS2 core customers and sales discussed above reflect static state conditions. Beginning in early 2000, FG&E began a marketing effort to attract new commercial and industrial customers as well as to retain residential customers. Expected results from this effort upon GS2 customers are presented in Table 2.24 below and added to the forecast.

Table 2.24: GS2 (Heating and Other) Class Forecast Summary Results

Therms	*Core Sales Forecast*	*Gas Marketing Forecast*	*Total Class Sales Forecast*
Total GS2 (Heating and Other) Class Forecast			
1999	5,929,650	0	5,929,650
2000	5,928,845	267,960	6,196,805
2001	6,105,191	689,509	6,794,700
2002	6,373,477	1,143,303	7,516,780
2003	6,715,912	1,468,160	8,184,072
2004	7,064,760	1,729,401	8,794,161
1999-2004	3.57%	N/A	8.20%

6. Total Company Demand Forecast

The core class sales forecasts developed above were summed to generate the total company core sales forecast as shown below in Table 2.25. Over the forecast period firm sales, independent of the gas marketing effort, are projected to increase by 0.63% annually. Including the impact expected from the gas marketing effort results in a forecast of total demand growth of 3.21% annually over the forecast period.

The class sales forecasts were developed on an annual basis. They were converted to a monthly basis by applying the average annual distribution of normalized sales by class for the past three years (1997-1999). The forecasts of class customers and sales, and the demand forecast are presented on a monthly basis on pages 39-50 of the Appendix.

Table 2.25: Total Company Demand Forecast Results

Therms	*Core Sales Forecast*	*Gas Marketing Forecast*	*Demand Forecast*
Total Company Demand (Firm Sales) Forecast			
1999	23,803,862	0	23,803,862
2000	23,656,356	504,028	24,160,383
2001	23,748,973	1,290,051	25,039,022
2002	23,985,471	2,124,485	26,109,955
2003	24,262,838	2,763,182	27,026,021
2004	24,566,607	3,304,450	27,871,059
1999-2004	0.63%	N/A	3.21%

E. FIRM TRANSPORT

FG&E has limited experience with Firm Transport (FT) service, which it began offering to its largest customers in June 1999. The eventual levels of customer migration that develop will be dependent upon future market conditions and the willingness of third party suppliers to serve residential and smaller commercial customers. In lieu of a quantitatively rigorous forecast of FT over the forecast period, FG&E has prepared three scenarios to encompass the realm of possible customer migration outcomes. These scenarios enable FG&E to demonstrate its flexibility in meeting supply obligations and minimizing costs under all possible customer migration outcomes.

The Base Scenario reflects the company's expectation of customer migration over the forecast period, and represents its forecast of FT deliveries. The Base Scenario assumes that migration in the year 2000, the first year of the forecast, will be the same as was experienced during late 1999, which represented 14% of firm deliveries (firm sales and firm transport). The level is expected to remain since nearly all of FG&E's largest customers took FT service in 1999 leaving few remaining to convert. In addition, the implementation of FT service to smaller customers has been delayed, and the response of both customers and suppliers is uncertain especially given the high fuel prices experienced during the past heating season. The Base Scenario assumes that the percentage of firm deliveries represented by FT service will increase by 5 percent annually after 2000.

The two other scenarios represent extreme scenarios, one with extremely high migration and one with extremely low migration. The High FT Scenario assumes that the percentage of firm deliveries represented by FT service will increase by 20 percent a year over the forecast period, leaving no customers taking firm supply from FG&E. The Low FT Scenario assumes that market volatility and other unforeseen conditions reduce participation in FT service to zero over the forecast period. Table 2.26 below depicts the three FT scenarios.

Table 2.26: Firm Transport Scenarios Over Forecast Period

	High FT Scenario	*Base FT Scenario*	*Low FT Scenario*
Percentages of Firm Deliveries under FT Service			
2000	20%	14%	0%
2001	40%	19%	0%
2002	60%	24%	0%
2003	80%	29%	0%
2004	100%	34%	0%

In the Resource Assessment portion of this filing, the company demonstrates its ability to meet its supply obligations and to optimize supply portfolio costs under design year and design day conditions for each of the FT scenarios.

F. NORMAL YEAR SENDOUT FORECAST

The demand forecast developed in the Customer Class Forecasts section represents total firm deliveries over the forecast period. The term delivery is now used instead of sales because future demand may be supplied by FG&E or by third party suppliers[8]. Likewise, the term throughput is used to represent deliveries at the system level. Firm throughput includes both firm sendout and firm transport. Prior to November 1999, when FT was implemented at FG&E, firm throughput was equal to firm sendout.

The historic relationship between monthly firm deliveries and monthly firm throughput was analyzed and projected throughout the forecast period using an exponential smoothing model. The projected relationship was applied to the delivery forecast to project firm throughput. Differences between firm deliveries and firm throughput include billing cycle effects, lost and unaccounted for gas and company use. By modeling this relationship over the historical period, FG&E was able to capture and project forward trends in the relationship. The exponential smoothing model captures variations by month as well as variations over time. Interestingly, the overall trend is slightly negative indicating that the percentage of lost and unaccounted for gas and company use are decreasing. The results of the estimation are presented on page 26 the Appendix.

Table 2.27 shows the forecasts of annual firm delivery and firm throughput, and annual growth rates for each. Each year in the forecast period, the throughput forecast grows by less than the delivery forecast, reflecting the gradual reduction in lost and unaccounted for gas.

Table 2.27: Firm Delivery and Firm Throughput Over Forecast Period

MMBTU	*Firm Delivery Forecast*	*Annual % Growth*	*Firm Throughput Forecast*	*Annual % Growth*
2000	2,416,038	1.50%	2,455,273	6.47%
2001	2,503,902	3.64%	2,534,904	3.24%
2002	2,610,996	4.28%	2,631,204	3.80%
2003	2,702,602	3.51%	2,709,098	2.96%
2004	2,787,106	3.13%	2,779,839	2.61%

The firm sendout forecasts were calculated for each of the three FT scenarios by subtracting the firm transport load associated with each scenario from the firm throughput forecast. Table 2.28 below shows the normal sendout forecast under the High FT, Base FT and Low FT scenarios. Under the High FT scenario, FG&E's sendout requirements drop to zero, while under the Low FT Scenario sendout requirements equal firm throughput. Under the Base FT Scenario, FG&E's sendout requirements drop by 3.21% annually over the forecast period.

Table 2.28: Normal Firm Sendout Forecast by FT Scenario

MMBTU	*Firm Throughput Forecast*	*High FT*	*Base FT*	*Low FT*
		Normal Sendout Forecast by FT Scenario		
1999	2,228,609	2,151,044	2,151,044	2,151,044
2000	2,455,273	1,964,219	2,105,008	2,455,273
2001	2,534,904	1,520,942	2,046,534	2,534,904
2002	2,631,204	1,052,481	1,992,720	2,631,204
2003	2,709,098	541,820	1,916,258	2,709,098
2004	2,779,839	0	1,827,304	2,779,839
1999-2004	4.52%	-100.00%	-3.21%	5.26%

G. PLANNING STANDARDS AND DESIGN FORECASTS

The Company designs its gas supply portfolio to meet extreme cold weather conditions, as reflected in the Company's planning standards. FG&E established its planning standards by analyzing the differences in cost to supply forecasted firm throughput requirements under various design cold scenarios.

The process involved calculating the HDD associated with cold weather conditions of varying probabilities of occurrence. The base load and weather-sensitive components of firm system throughput were also calculated, then applied to the various design weather conditions to generate forecasts of firm throughput associated the different design conditions. This was done on a design cold year and design cold day basis. In establishing the planning standards, the FG&E took the conservative approach of showing how it would optimize its supply to meet the full requirements of firm throughput. That is, the analysis supporting the design standards did not take firm transport into consideration, or assumed it would be zero as in the Low FT Scenario. The analysis is presented in the Resource Assessment section.

1. Weather Data

Development of the planning standards begins with the identification of a complete and updated weather database. As reported earlier in the Data Description section, the Company has continued to use the Worcester-Bedford database, which continues to be updated by Weather Services, Inc. The database has been approved in the Company's previous two Gas Integrated Resource Plans, see Orders in DPU 94-140 and DTE 98-55. In its probability analysis of the design weather conditions, the Company utilized data from 11/01/1964 through 10/31/1999, encompassing a period of 35 complete gas years.

The calculations of HDD associated various design year and design day weather conditions were developed using a model prepared by Management Applications Consulting, Inc., which is now maintained by the Company. This model was approved in the Company's 1994 Gas Integrated Resource Plan. The model calculates the mean and standard deviations of the data then applies a normal distribution to derive HDD levels associated with different probabilities of occurrence. Yearly and peak day HDD levels with probabilities of occurring once in 20, 30, 40, 50 and 100 years were calculated. The output illustrating these calculations is presented on pages 27-29 of the Appendix.

2. Normal Year Degree-Day Standard

While FG&E plans its gas supply to meet design standards, it recognizes that a normal year is more likely to occur. The Company determined its normal gas year standard to be 6,659 HDD by calculating an arithmetic average of HDD for each of the past 35 gas years (1964/65 – 1998/99) from the Worcester-Bedford database.

3. Design Year Degree-Day Standard

The Company currently uses a 1 in 30 year occurrence for its design cold year standard. Table 2.29 shows the HDD expected in a normal gas year, and in design cold gas years with probabilities of occurring once in 30, 50 and 100 years. As mentioned above, the normal year standard is the arithmetic average of 6,659 HDD observed over the past 35 gas years. The standard deviation around this average was 333.6 HDD. Applying a standard normal distribution, the HDD associated with design cold gas years with probabilities of 1 in 30, 1 in 50 and 1 in 100 were calculated. See page 27 of the Appendix.

Daily base load and weather-sensitive components of firm throughput were estimated for each month of the year using daily firm throughput and daily HDD data from January 1, 1983 through December 31, 1999. The data were sorted by month and separate regressions were run for each month, using all available data for each month. For instance, data for all Januarys was used to estimate daily base load and the weather sensitive component for January, and so on for each month[9]. The regressions are included on pages 30-36 of the Appendix.

The base load and weather-sensitive components were applied to the HDD associated with each design condition to generate the forecast for each design condition. These forecasts are shown in Table 2.29. The design forecasts were incorporated into the analysis presented in the Resource Assessment section of the IRP. The analysis concludes that a design cold year planning standard of 1 in 30 continues to be optimal for FG&E.

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[9] In the way of a demonstration, in addition to each month regression, a single regression of all data was also estimated. The regression employed dummy variables to estimate daily base load and weather sensitive load components for each month of the year. The results were used to calculate the components, which are identical to those estimated using only data specific to each month as just described. The calculations and regression results are included on page 36 of the Appendix.

Table 2.29: Design Cold Year Heating Degree-Days and Gas Loads

Heating Degree-Days by Design Cold Year					
	Mean	*Std. Dev.*	*1 in 30*	*1 in 50*	*1 in 100*
Normal Year HDD	6,659	333.6			
Design Year HDD			7,270	7,344	7,435
Incremental HDD			612	685	776

Gas Loads (year 2000) by Design Cold Year				
MMBTU	*Normal*	*1 in 30*	*1 in 50*	*1 in 100*
Firm Throughput	2,455,273	2,591,610	2,608,122	2,628,428
Incremental Thruput		136,337	152,849	173,155

Table 2.30 shows FG&E's design cold year forecast over the forecast period, presented in terms of firm throughput and firm transport and sendout under the Base FT Scenario. The forecast reflects design cold year conditions expected to occur once every thirty years.

Table 2.30: Design Year Firm Throughput, Transport and Sendout

MMBTU	*Firm Throughput*	*Firm Transport*	*Firm Sendout*
2000	2,591,610	369,715	2,221,895
2001	2,675,438	515,445	2,159,993
2002	2,776,930	673,845	2,103,085
2003	2,859,052	836,725	2,022,327
2004	2,933,580	1,005,216	1,928,365

4. Design Day Degree-Day Standard

The Company currently uses a 1 in 30 year occurrence for its design cold day standard. Table 2.30 shows the HDD expected during a normal a peak day, and during peak days with probabilities of occurring once in 30, 50 and 100 years. The normal year peak day is 62 HDD, rounded from the arithmetic average of 62.49 HDD observed over the past 35 gas years. The standard deviation around this average was 3.89. Applying a standard normal distribution, the HDD associated with design cold gas years with probabilities of 1 in 30, 1 in 50 and 1 in 100 were calculated to be 70, 71 and 72, respectively. See page 28 of the Appendix.

On the FG&E system, use of the daily base load and weather-sensitive components estimated from all data (as described above under Design Year Degree-Day Standard) consistently underestimated peak day firm throughput. Therefore, base load and weather-sensitive components for peak days were estimated separately, using only data for the peak day experienced each January from 1983 through 1999[10]. The data were modeled by regressing peak day firm throughput against HDD that day and a trend variable. To assess how well the estimated parameters fit the actual peak days experienced, they were used to backcast peak day sendout each year, given the actual HDD that occurred. The results of this analysis are presented in the Appendix on pages 37-39, along with the regression output.

Applying the peak day base load and weather-sensitive components to the HDD associated with each design condition, peak day forecasts were generated for each design condition. These forecasts are shown in Table 2.31. The design forecasts were incorporated into the analysis presented in the Resource Assessment section of the IRP. As with the design cold year planning standard, the analysis concludes that a design cold day planning standard of 1 in 30 continues to be optimal for FG&E.

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[10] Data from each January was chosen because nearly all peak days have occurred in January. Using each January avoids the problem of having 2 peak days from the same gas year in cases when a peak day occurred in December, which would disturb the trend estimate.

Table 2.31: Design Cold Day Heating Degree-Days and Peak Day Gas Loads

Heating Degree-Days by Design Cold Day					
	Mean	*Std. Dev.*	*1 in 30*	*1 in 50*	*1 in 100*
Normal Year HDD	62.49	3.89			
Design Year HDD			70	71	72
Incremental HDD			8	9	10

Peak Day Gas Loads by Design Cold Day (year 2000)				
MMBTU	*Normal*	*1 in 30*	*1 in 50*	*1 in 100*
Firm Throughput	19,172	21,255	21,532	21,810
Incremental Thruput		2,083	2,360	2,638

Table 2.32 shows FG&E's design cold day forecast over the forecast period, presented in terms of firm throughput and firm transport and sendout under the Base FT Scenario. The forecast reflects design cold day conditions expected to occur once every thirty years.

Table 2.32: Design Day Firm Throughput, Transport and Sendout

MMBTU	*Firm Throughput*	*Firm Transport*	*Firm Sendout*
2000	21,255	3,039	18,215
2001	21,338	3,051	18,287
2002	21,421	3,063	18,358
2003	21,505	3,075	18,429
2004	21,588	3,087	18,501

H. COMPLIANCE WITH DTE 98-55 ORDER

The following is a list of directives ordered in DTE 98-55 and deficiencies noted therein relating to FG&E's forecast methodology, and brief discussion on how these issues have been addressed.

1. FG&E did not perform "a reasonable statistical analysis of the recurrence probability of its design year standard." (DTE 98-55, at 6)

   FG&E's current design year standard, as well as alternative standards that were analyzed, was developed on a probabilistic basis by applying a standard normal distribution to historic observations over the past 35 years.

2. FG&E did not perform "an optimization analysis containing a cost-benefit calculation" (Id. at 6) in support of its design year standard.

   FG&E performed an analysis supporting the use of its current design year standard.

3. FG&E "did not develop its design day calculation with a cost benefit analysis or a probabilistic analysis." (Id. at 7)

FG&E's current design day standard, as well as alternative standards that were analyzed, was developed on a probabilistic basis. In addition, FG&E performed an analysis supporting the use of its current design year standard.

4. FG&E "did not distinguish between the concepts of demand forecast and sendout forecast" (Id. at 8). The Department expressed concern that "this assumption does not take into consideration the efforts to reduce system losses." (Id. at 9)

   FG&E has distinguished between the concepts of demand forecast and sendout forecast, and has projected the relationship between demand and sendout in a manner that captures changes in the underlying trend.

5. "The Department directs Fitchburg, in its next filing, to provide a forecast of customers migrating from sales service to transportation service. (Id. at 10)

   FG&E has made scenario assumptions about the future of customer migration. FG&E's Base FT Scenario projects firm transport in the year 2000 to be a similar percentage of firm throughput as was experienced in late 1999. This percentage is expected to increase by 5 percent annually over the remaining forecast period.

6. FG&E "did not present a systematic analysis of the relationship between sendout, degree days and other factors which may be potentially significant," (Id. at 11) in support of its normal and design year sendout forecasts.

   FG&E has presented a systematic relationship between firm sendout and degree days in developing its design year sendout forecast. In addition, the demand forecast underlying the normal year sendout forecast is based upon a systematic analysis of economic and demographic factors.

7. The Department had the same concerns indicated above with regard to FG&E's design day sendout forecast. (Id. at 11)

FG&E has presented a systematic relationship between peak day firm sendout and peak day degree days in developing its design day sendout forecast.

8. FG&E "did not forecast the number of customers or the average use per customer," while "other Massachusetts LDCs routinely estimate both variables." (Id. at 12)

FG&E did forecast the number of customers for each class. FG&E also attempted to forecast use per customer for each class, but was successful in doing so only for the residential class. This result has been experienced by other Massachusetts LDCs. Commonwealth Gas Company, DTE / DPU 96-117, at 8-13 (2000).

9. FG&E "omitted economic and demographic factors that may affect the level of use for all customer classes." The Department noted that "the exclusion of potentially relevant economic and demographic variables may result in greater deviations of forecast sendout numbers from actual realizations than there would otherwise be." (Id. at 12)

FG&E incorporated economic and demographic variables in the process of developing its class sales forecasts.

10. Regarding the forecasting model presented by FG&E in DTE 98-55, the Department noted that, "given the Company's specification of its econometric model, the resulting t-test ratios show that nine of the variables used proved to be statistically insignificant." (Id. at 12)

The econometric model presented in DTE 98-55 was similar to the regression equation included on page 36 of the Appendix. These regressions both utilized dummy variables to capture month to month changes in daily base load and in the weather-sensitive component of sendout. Although t-statistics associated with some dummy variables in such a model may be "insignificant", the reason is not that they fail to explain the dependent variable. Rather, dummy variables differentiate between the impact of an independent variable (the Constant for daily base load; and HDD for the weather-sensitive component) upon the dependent variable from one period to another.

An example will illustrate this. The regression on the bottom of page 30 of the Appendix uses data only for the month of February, produces a parameter estimate of 237.88 for FEBDD, and shows that HDD in February are very significant in explaining sendout in February (t-statistic = 62.42). Turning back to the regression on page 36 of the Appendix, we see that the dummy variable representing HDD in February (FEBHDD) shows an insignificant t-statistic (=1.69). This is because HDD in February impact sendout in a similar fashion as they do in January. The dummy variable is measuring the difference between the impact of HDD on sendout in January and the impact of HDD on sendout in February, which difference is not significant. The parameter estimate for January is 247.72. Adding the parameter estimate of FEBHDD, -9.84, which represents this difference, to the Januray estimate we get 237.88. This is the same value we estimated directly from the February only data, which we showed a very significant t-statistic. Thus in a single regression, we obtained the information found in all 12 monthly regression on pages 30-35 of the Appendix.

11. FG&E is "directed to provide sales forecasts that are class specific, complete, clearly presented, and contain summaries that sufficiently explain all methods used, assumptions made, and data presented." (Id. at 13)

FG&E has provided class specific sales forecasts and has described in detail all forecasting methods, assumptions and data used, including adjustments made for weather normalization and for the introduction of a new rate design and the implementation of firm transport service.

12. Finally the Department directed FG&E "to employ a more sophisticated econometric specification for its forecast model and eliminate model flaws before filing."

FG&E has employed a much more sophisticated econometric specification for its forecasting models as described throughout this Requirements Assessment section. In addition, FG&E has made every effort to eliminate model flaws and to ensure the accuracy of the materials presented in this filing.

III. RESOURCE ASSESSMENT

A. RESOURCE PLANNING GUIDELINES

FG&E's resource planning, acquisition and management process is guided by the Company's Gas Resource Planning Guidelines (the Guidelines). The Guidelines are flexible criteria which serve to focus the decision making process on the key factors leading to success in achieving a least-cost reliable system. The Guidelines are not precise quantitative standards because such standards can never reflect the myriad of factors that must be assessed given the complexity and uncertainty of the long range planning process for an LDC. Over reliance on quantitative analyses or inflexible numerical standards, no matter how sophisticated, can never entirely replace sound professional judgment based on solid evaluation using contemporary analytical techniques and the experience of the marketplace. FG&E recognizes that competitive market forces, properly utilized within the framework of the Guidelines, may be harnessed to provide firm customers with significant value. The strength of the Company's resource portfolio can be demonstrated by making an assessment of the Plan's compliance with the Guidelines. This section reviews each of the Guidelines and provides a discussion of how the Company's Plan conforms to that Guideline.

The Company's Resource Planning Guidelines are as follows:

- Maintain a reliable, flexible planning process that results in meeting firm customers needs at the least cost.

- Employ resource identification and acquisition procedures that result in procurement of appropriate demand and supply side resources.

- Maintain a portfolio of long and shorter-term resources capable of meeting firm customer needs effectively, even in changing and uncertain market conditions.

- Acquire achievable cost-effective demand-side resources through orderly implementation of DSM programs.

- Maintain diversity of natural gas supplies through:

  1) Geological and geographical diversity of supply basins;

  2) Limiting dependence on individual suppliers; and

  3) Limiting reliance on Canadian and other imported resources.

- Maintain costs within a competitive range.

- Manage the risks of non-price factors associated with gas supply and transportation contracts.

- Maintain local production capability to supplement pipeline supplies on peak winter days and to meet firm customers needs during the summer for a pipeline failure.

- Seek to identify cost-effective alternative pipeline deliveries to reduce risk of failure of the interstate pipeline facilities serving the Company.

Maintain a reliable, flexible planning process which results in meeting firm customer needs at the least cost is demonstrated by the Department's findings in the Company's request for approval of Order 636 conversion supply contracts. In its order approving FG&E's conversion supplies, the Department found that the Company's RFP process employs a selection criteria consistent with the Department's standards, which focus on securing low-cost, flexible, reliable and diverse resources for the benefit of firm ratepayers. The Company continues to utilize this same RFP process on a semiannual basis to procure additional liquid and vapor supplies.

The process includes evaluation of resources in three phases as follows: 1) Drafting and issuance of an RFP and receipt of supplier bids; 2) selection of a short list of suppliers from the bids submitted, and 3) negotiation with listed suppliers and selection of winning proposals.

An RFP addresses the Company's needs given current market and portfolio states. Needs are assessed with current information and forecasts of future market conditions in relation to the specific needs of the portfolio. Portfolio optimization is performed via the use of the Sendout Optimization Software, market information, and Company judgement based upon numerous years of market experience.

Typically RFP's are sent to at least 10 potential suppliers with a short list of these suppliers selected for their ability to provide reliable service at the most competitive or flexible terms and conditions. After bids are received, the Company continues to conduct informal discussions with each short-listed supplier in order to clarify and improve bids. The negotiations become an iterative process whereby an ongoing effort is made to move the contract price, terms and conditions into a package that maximizes the service and other non-price performance factors while minimizing price and risk.

After the short list is created, the Company develops an analysis to compare the price and non-price attributes of all bids. Price and flexibility options are evaluated using the Sendout optimization software to identify the proposal that offers the least cost fit with existing resources. Examples of price and non-price attributes that may be considered (in the event that these attributes are applicable to specific needs at specific time periods) are as follows: 1) Index formula used to develop commodity price; 2) reservation or demand charges; 3) price caps; 4) Nominating flexibility; 5) financial viability of suppliers; 6) supply warranty provisions, 7) supply diversity; and 8) all other attributes that allow the company to operate within the procurement Guidelines presented here.

Employ resource identification and acquisition procedures which result in procurement of appropriate demand and supply side resources is demonstrated by the positive results the Company achieved in procuring its Order 636 replacement supplies and resources the Company has procured on the short term market since that solicitation. In its order, the Department found the solicitation process used by the Company resulted in the development of bids that represented a range of negotiated market offerings. This process continues to guide the Company in conducting an RFP process that results in a range of available options that accurately reflect the marketplace for gas supplies.

Maintain a portfolio of resources capable of meeting firm customer needs effectively, even in changing and uncertain market conditions. The implementation of this Guideline provides a guard against the Company experiencing excessive resource needs or excessive resources at a single point in time, while affording flexibility to acquire or discontinue supply resources in regular, consistent blocks. Compliance with this Guideline requires a mix of short to medium term contract lengths with staggered or seasonal termination dates.

The Fitchburg supply portfolio conforms with this Guideline with its mix of supply and underground storage contracts that expire over the 5-year planning period while providing broad flexibility to the Company in the form of term extension options. Due to the uncertain state of retail competition, maintaining flexibility in the mix of longer term and shorter-term supply resources is a key consideration in the Company's portfolio optimization process. In addition, the Company maintains a portfolio of transportation contracts that have deliverability and termination dates that are closely matched to supply commitments.

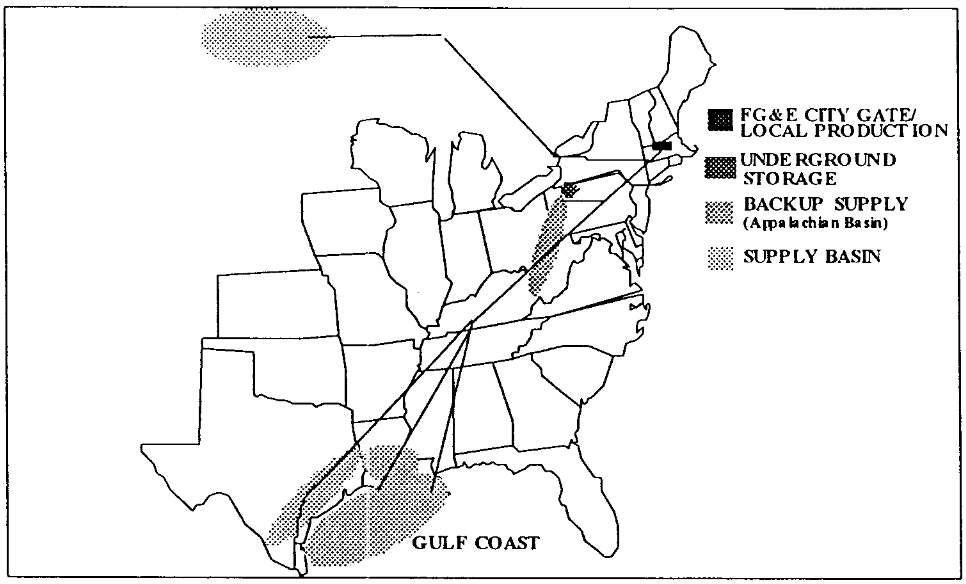
FG&E's entire supply portfolio has commodity prices that are linked to published price indexes. Because nearly all longer term (one year or greater in duration) as well as shorter term gas agreements have prices linked to these same indexes, contracting in the short to medium term markets does not expose customers to any more price risk than if the Company contracted for longer term supply arrangements. Furthermore, the risk of being unable to acquire the necessary volumes in the short to medium term markets is very small given the level of FG&E's resource needs and the size and competitiveness of the gas market. This strategy provides the Company with the flexibility needed to pursue new transportation and supply alternatives and to adapt to changing market conditions as they develop.

Acquire achievable cost-effective demand-side resources through orderly implementation of DSM programs. The Company is committed to the integration of DSM and supply resources in its planning to satisfy total firm customer requirements. The Company's DSM strategy is laid out in detail in Section IV of this IRM.

Maintain diversity of natural gas supplies through geological and geographical diversity of supply basins is demonstrated by Figure 3.1, which shows the Tennessee Gas

Pipeline system and the locations on the system where the Company receives its pipeline supplies. The figure shows that the Company draws from both the onshore and offshore supply basins of Texas and Louisiana, as well as the Western Canada supply basin. This diversity provides security of supply in light of a variety of weather related supply disruptions including the shut down of offshore wells as a result of tropical storm conditions or the curtailment of onshore supply delivery as a result of freeze-offs. In addition to the supply diversity within the Gulf Coast supply basin, the back-up for these supplies is located in the Appalachian supply basin as shown in the Figure. The Company's Canadian supply, underground storage entitlements, local production capability, and supply contract provisions for firm back-up supply from Appalachian Basin supplies, taken as a whole, provide additional significant geographical diversity that mitigates the consequences of supply curtailment.

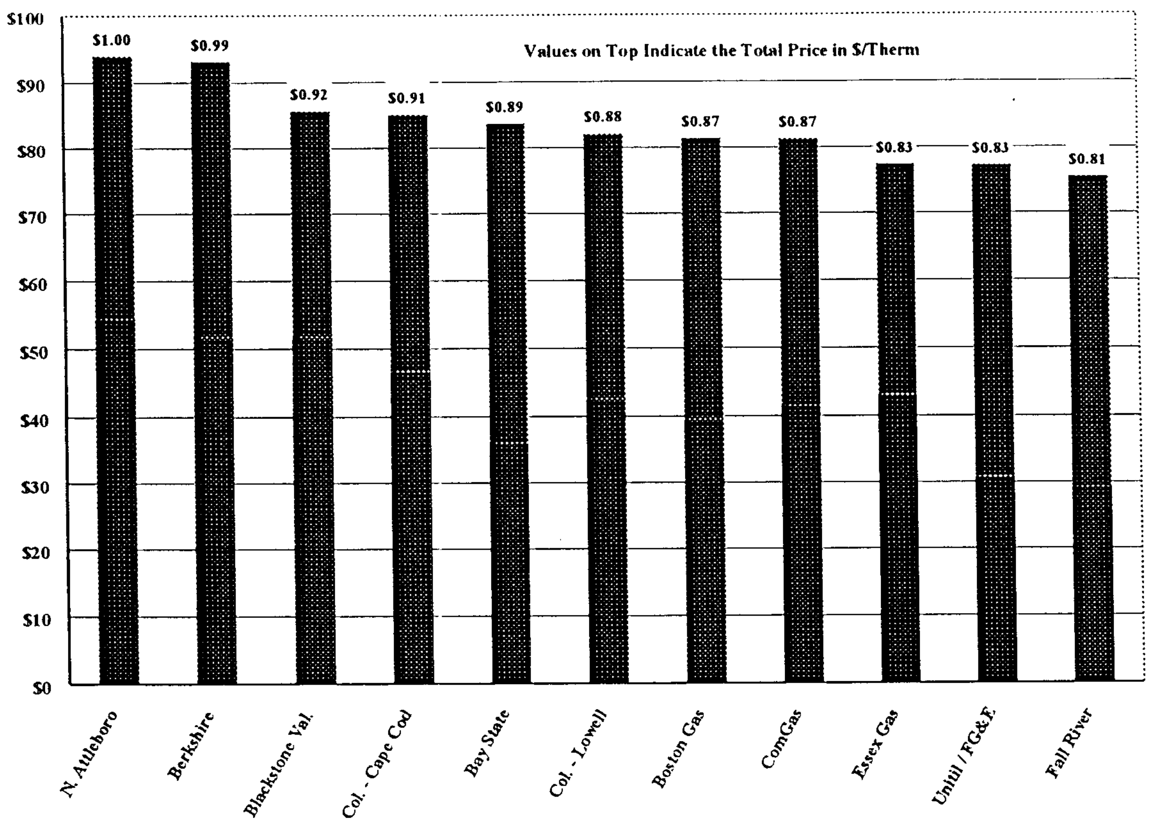
Figure 3.1: FG&E Supply Sources



Limit dependence on an individual supplier and limiting reliance on Canadian and other imported resources is demonstrated by the diversity of suppliers in the Company's supply portfolio. By requiring consideration of these non-price aspects of the Plan, risks associated with the operation and management of any particular resource are contained. These planning considerations guard against over committing to low cost resource alternatives that may have higher risks, and also require that tradeoffs between risk and economics be made explicit in the decision making process.

The Company's Plan demonstrates the commitment to ***maintain costs within a competitive range.*** As shown in Figure 3.2, total gas costs for the year ended 1999 were competitive with other Massachusetts LDC's.

Figure 3.2: Comparisons of Average Monthly Bills for Typical Residential Gas Heating Customers in Massachusetts (1999/2000)



These positive results are being achieved with a strong and diverse supply portfolio that is responsive to a range of weather driven sendout requirements and is reasonably secure against supply disruption. A discussion of analyses conducted to evaluate the adequacy of FG&E's supply portfolio under a range of weather driven sendout and operating conditions is provided in a subsequent section of this IRP.

Manage the risks of non-price related factors associated with gas supply and transportation contracts is an important part of supply contract negotiations. As stated above the Company's achievement of this Guideline is evidenced by the terms and conditions that are a part of the Company's supply contracts associated with nominating flexibility, price caps, financial viability of suppliers, supply warranty provisions, etc.

Maintain local production capability to supplement pipeline supplies on peak winter days and to meet firm customer needs during the summer for a pipeline failure is demonstrated by the Company's continued operation of its LNG and Propane-Air facilities. The Company's supplemental LNG supply coupled with firm pipeline supplies and underground storage provide sufficient capacity to meet the peak day sendout as well as the design winter sendout requirements.

Seek to identify cost-effective alternative pipeline deliveries to reduce risk of failure of the interstate pipeline facilities serving the Company. Currently FG&E receives transportation to its city-gate only on the TGP system. The Company will consider proposals for new pipelines that offer delivery to the FG&E city-gate by weighing the cost of the proposed facility and the benefits to firm customers. As previously discussed, the Company has positioned its transportation contract portfolio in a way that will permit replacement in the longer term with alternatives that could include transportation on other interstate systems that interconnect with TGP. As the Maritimes and Northeast Pipeline interconnects with the TGP system, opportunities to contract for alternative pipeline supplies may increase. However, ultimate delivery to the Company's city-gate will continue to be dependent on the Fitchburg lateral segment of the TGP system.

B. APPLICATION OF RFP PROCESSES AND RESOURCE PLANNING GUIDELINES

These Guidelines were most recently applied during the RFP processes conducted in August 1999. Design cold scenarios were analyzed for the winter season and for a single peak day assuming no customer migration. The mix of pipeline, storage, and peaking usage was determined using New Energy Associates Inc.'s Sendout optimization model. The model's output helped the Company determine three key items;

1. Optimal peaking gas supplies;

2. Optimal additions to pipeline supplies for the winter months; and

3. Optimal storage withdrawal path.

Once the optimal mix of resources was determined, FG&E analysts worked with management and operational personnel to define additional flexibility and reliability contract requirements. While Sendout is a useful optimization tool, it is not a substitute for the experience and judgement of the Company's employees, nor does it allow for variability in weather patterns or for pipeline restrictions that inevitably cause demand and supply forecasts to diverge. The impact of possible customer migration is also considered with the same group of employees to determine what impact third party suppliers may have on the resource mix.

In 1999, there were two examples of these types of judgmental decisions. First, the amount of peaking supply needed to serve firm customer was expected to be lower due to the impact of customer migration to the Company's IFT tariff. In hindsight, the expectation proved to be true, but due to the uncertain nature of a third party nominating firm gas the FG&E citygate for the first time, FG&E choose to acquire LNG supplies as if it had to serve all firm customers. After all, the Company would have to supply migrating customers if they choose to drop their supplier service.

Second, the storage path was altered to keep more gas in storage early in the season for use later in the winter. Supply contract are often purchased to allow FG&E to keep its gas storage inventory level high early in the season. This is done so that, in the event of a design cold winter, storage ratchet points will not constrain the volume of gas that can be delivered to the citygate late in the winter season. These judgmental decisions allowed the operators of the Company's gas system to successfully adapt to the unusually cold weather and operational conditions that were experienced in January, 2000.

C. SUPPLY PORTFOLIO

An overview of FG&E's suppliers and supply contract terms is shown in Table 3.1. The current portfolio consists of six firm pipeline supplies, two underground storage agreements, and two firm LNG supply agreements.

Table 3.1: Supply and Storage Contract Summary

Contract	Terms	MDQ	Expiration
CNG Storage	151 day storage	466	3/31/2001
TGP Firm Storage	4807 daily swing.	4807	3/31/2004
Engage Energy	Monthly nomination.	1596	10/31/2000
Engage Energy	Monthly nomination with daily swing.	2638	3/31/2000
Aquila	Monthly nomination.	2000	10/31/2002
Dynegy	Monthly nomination.	2000	10/31/2002
Coral Energy	Monthly nomination.	1500	3/31/2000
Boundary Gas	Monthly nomination.	534	1/15/2003

1. Pipeline Supplies:

FG&E has a 15 year contract with Boundary Gas, Inc. ("BGI") for 530 Mcf/day of Canadian supply delivered to the TGP system at Niagara, NY. BGI is a special purpose corporation organized to supply a group of northeast buyers from the Western Canada supply basin. This supply has daily nominating flexibility (i.e. May be taken anywhere from 0 to 530 Mcf a day) but must be taken at an average annual load factor of at least 60 percent. This contract ends on January 15, 2003.

FG&E has a 10 year contract with Aquila Energy Marketing Corporation ("Aquila") for a base load supply of 2000 dth/day. Although expected to operate in a base load mode, the contract contains flexible nomination provisions that may be exercised to provide firm customers with additional benefits. This supply contract received Department approval in

1992 as part of the Company's Cosmic conversions. Aquila is a wholly owned subsidiary of Utilicorp United, Inc. Aquila provides this firm service obligation to FG&E from a number of different Gulf Coast producers drawing on both onshore and offshore production basins. This contract has a termination date of October 31, 2002, but continues in effect afterward unless either buyer or seller provides 180-day notice of termination.

The Company has a 10-year contract with Dynegy, formerly Natural Gas Clearinghouse, for a supply of 2000 dth/day. Although expected to operate in a base load mode, the contract contains flexible nomination provisions that may be exercised to provide firm customers with additional benefits. This supply contract received Department approval in 1992 as part of the Company's Cosmic conversions. Dynegy provides this firm service obligation to FG&E from a number of different Gulf Coast producers drawing on both onshore and offshore production basins. The contract has a termination date of October 31, 2002, but FG&E may extend the contract with 6 months prior notice.

The Company's 6-year contract with Duke Energy, formerly Union Pacific Fuels Inc., expired 10/31/99. The 2638 dth/day supply was replaced with a winter contract from Engage Energy that provided both base load supply with monthly nominating flexibility and swing service. Engage is a subsidiary of the Coastal Corporation and West Coast Energy Inc., and its supplies originate in the Gulf coast. In the future, FG&E will continue to contract in the market place on a seasonal basis for similar supplies as needed.

The Company has a one-year contract with Engage Energy for a 1596 dth/day supply. The Engage contract provides baseload supply with monthly nominating flexibility. The contract term began on November 1, 1999 and ends on October 31, 2000 with no explicit renewal terms. However, this contract has been extended for one year terms under these conditions repeatedly since its original expiration date.

A winter 1999-2000 contract was signed with Coral Energy for up to 1500 dth/day of supply. The Coral contract provided base load supply with 1st of month nomination flexibility. The contract term was from November 1, 1999 through March 31, 2000. Each year FG&E contracts for a supply such as this to ensure that its storage facilities do not get drawn down too quickly in the event of a design cold winter. An RFP for a similar contact will be issued in the late summer of each year to obtain such a supply.

2. Underground Storage:

The Company has a 20-year contract with CNG Transmission Corporation (CNG) for underground storage having deliverability of 468 dth/day. This contract commenced in 1980 and expires March 31, 2001. The contract contains an evergreen clause that provides for this arrangement to remain in effect for additional two-year periods unless FG&E or CNG provide notice of intent to terminate. CNG gave its intent to terminate the contract in June 1999. Because of CNG's competitive storage tariff rates, FG&E expects to renew the contract prior to its expiration.

The Company has a contract with Tennessee Gas Pipeline for underground storage having deliverability of 4807 dth/day. This contract was made available to the Company through the Cosmic Settlement and provides bundled storage and transportation service. Since the September 1993 implementation of FERC Order 636, however, the storage and transportation segments of the contract have been separated. This contract has a termination date of March 31, 2004, but continues in effect afterward unless either buyer or seller provides 30-day notice of termination.

3. Local Production:

The Company operates a satellite LNG storage and vaporization facility that is capable of delivering 7,200 dth/day of sendout requirement. FG&E plans to continue to provide LNG storage/vaporization capability. FG&E also plans to extend or replace the current LNG supply agreements with the Distrigas of Massachusetts Corporation and Connectiv/CNE Peaking. These agreements each provide 40,000 dth/year LNG supply callable on a day ahead basis. FG&E also owns a propane storage facility that is capable of delivering 7,200 dth/day of sendout requirement.

4. Pipeline Transport Services

The Company has contracted for FERC approved TGP transportation service under rate schedule FT-A, and for storage service under rate schedule FS.

FG&E also has an Operation Balancing Agreement (OBA) with TGP. The Company's OBA provides a daily balancing and end of the month "true-up" mechanism for differences between total volumes nominated and actual sendout requirement. End of the month imbalances, within a set tolerance range, are "cashed out" in accordance with a FERC approved rate schedule. FG&E's existing pipeline service contracts are summarized in Table 3.2.

Table 3.2: Pipeline Contract Summary

Contract Number	Service Type	Capcity (Dth/day)	Expiration
267	FT-A	466	3/31/2004
268	FT-A	2795	3/31/2004
8519	FT-A	1596	3/31/2004
2273	FS-MA	N/A	3/31/2004
2374	FT-A	2012	3/31/2004
2915	FT-A	2638	3/31/2004
2916	FT-A	2000	10/1/2002
2919	FT-A	2000	10/1/2002
252	FT-A	534	1/14/2003

D. MARKETPLACE AND SHORT TERM CONTRACTING ISSUES

The marketplace for gas supplies is extremely competitive. During its seasonal contracting process, the Company has received responses to its Request of Proposals from up to half a dozen marketers who have pricing terms that are often within fractions of a penny of each other. The most common pricing terms are linked to a widely published index such as

Inside FERC or Gas Daily, and have a simple $/dth adder on the index for a profit margin. This makes economic decision making very transparent and the analysis of pricing alternatives relatively straightforward.

Because of this pricing structure, new supply contracts have nearly identical pricing terms to their long-term predecessors. The only significant difference is in the demand charge. Demand charges are usually not required when contracting for terms of less than a year, and this makes short term contracting more cost effective. Short term contracting also allows the Company to adapt quickly to customer migration, and minimizes the cost shifting that would occur if fixed supply costs had to be allocated to customers who do not chose a competitive supplier.

E. ANALYSIS OF RESOURCES UNDER NORMAL, DESIGN AND RETAIL CHOICE SCENARIOS

1. Overview.

Uncertainty associated with the inception and vigorousness retail competition creates difficulties in preparing a comprehensive resource acquisition plan. The following sections present the current resource mix assuming that all supply and storage contracts are extended throughout the planning horizon at identical terms. As contracts expire the company's RFP process will be utilized and the Company will adhere to its stated Guidelines in ensuring its ability to reliably meet changing resource conditions in the most cost effective manner possible.

2. Design Standards

Throughput forecasts for a 1 in 30, 1 in 50, and 1 in 100 year are analyzed to determine the adequacy of the Company's design condition supply standards. The Sendout software package by New Energy Associates was used to determine the cost implications of the different design scenarios. Table 3.3 summarizes the results.

Table 3.3: Incremental Supply Costs

Year	Change from 1 in 30 to 1 in 50		Change from 1 in 30 to 1 in 100	
2000/2001	$	77,120	$	175,956
2001/2002	$	81,515	$	182,446
2002/2003	$	47,213	$	106,201
2003/2004	$	46,750	$	104,488
Average	$	63,149	$	142,273

The cost of serving more stringent design scenarios increases mainly due to increases in the variable costs of commodity and transportation. However, demand charges on peaking resources do constitute between 17% and 30% of the total incremental supply costs. Because peaking resources serve a substantial proportion of the incremental load, additional peaking resources must be obtained for more stringent design standards. The demand charges on the Company's peaking supplies totaled about $106,000 for the 1999-2000 winter season. If the design standard was increased to 1 in 50, an additional $14,000 dollars in demand charges would have been incurred. A 1 in 100 standard would have resulted in a $30,000 increase in demand charges over the 1 in 30 standard. When considered in the context the total demand charges paid for peaking resources, these costs represent a 13% to 28% increase in demand charges.

As shown on Table 3.3, the increase in supply costs associated with changing from a 1 in 30 year design standard to a 1 in 50 year design standard average nearly $50,000 per year, while changing the design planning standard from a 1 in 30 to a 1 in 100 year standard would require on average an additional $142,000. In addition, the cost involved from increasing the standard must be weighed against the small probability that the 1 in 30 occurrence would be exceeded. Furthermore, even in the event that the standard would be exceeded, operational problems would occur only if the propane air facility (used as a first contingency to the LNG peaking facility) was unavailable, and no short term gas supplies were able to be purchased.

For these reasons, it is the company's position that the extra costs associated with raising the design standard are not justified at this time for either the design year standard or the design day standard. The company will continue to use the 1 in 30 year planning standard for its design day and design year criteria to satisfy customer needs in a least cost manner while meeting relatively stringent reliability standards.

3. Forecast of Resources Under Normal and Design Year Requirements Conditions

Tables 3.4 and 3.5 outline the adequacy of the portfolio to meet normal and design year conditions. The Company has the flexibility to adjust for future DSM savings and extend virtually all of its supply arrangements and many contracts. For example, the Aquila and Dynegy supply contracts and the Tennessee Firm Storage and CNG storage contracts have specific extension clauses included in their contract language. The shorter term yearly contracts such as the two Engage contracts and the Zone 4 Supply Contract have been extended in the past with virtually identical price and non price terms. Thus, Table 3.4 and 3.5 represent a scenario in which all contract extension options are invoked in order to allow their continuance through the planning horizon. In reality at the end of each contract term, the Company will invoke its RFP process and Guidelines detailed earlier in this document in making decisions. These decisions will be made first on the need for renewal given the pace of retail competition and second on the optimal terms for renewal given the state of the portfolio at the given time.

Table 3.4
Comparison of Resources and Requirements (Table G-22N)
Resource Extension Option Scenario

	Normal Winter (MMbtu)					Normal Summer (MMBtu)				
	1999-00*	2000-01	2001-02	2002-03	2003-04	2000	2001	2002	2003	2004
Firm Sendout	1,541,962	1,693,985	1,759,259	1,821,398	1,866,230	784,947	813,333	846,437	873,280	898,342
Storage Refill	0	0	0	0	0	366,350	366,350	366,350	366,350	366,350
Total	1,541,962	1,693,985	1,759,259	1,821,398	1,866,230	1,151,297	1,179,683	1,212,787	1,239,630	1,264,692
Resources										
Boundary	80,634	80,634	80,634	80,634	80,634	114,276	114,276	114,276	114,276	114,276
Aquila	302,000	302,000	302,000	302,000	302,000	278,200	278,200	278,200	278,200	278,200
Dynegy	302,000	302,000	302,000	302,000	302,000	278,200	278,200	278,200	278,200	278,200
Swing Contract (Engage)	398,338	398,338	398,338	398,338	398,338	0	0	0	0	0
Engage	240,996	240,966	240,966	240,966	240,966	341,544	341,544	341,544	341,544	341,544
Storage	366,350	366,350	366,350	366,350	366,350	0	0	0	0	0
Zone 4 Supply	226,500	226,500	226,500	226,500	226,500	0	0	0	0	0
Peaking	80,000	80,000	80,000	80,000	80,000	0	0	0	0	0
Incremental Market Purchases	0	0	0	0	0	139,077	167,463	200,567	227,410	252,472
Total	1,996,818	1,996,788	1,996,788	1,996,788	1,996,788	1,151,297	1,179,683	1,212,787	1,239,630	1,264,692

*Using actual November and December 1999 Data

Table 3.5
Comparison of Resources and Requirements (Table G-22D)
Resource Extension Option Scenario

	Design Cold Winter (MMbtu)					Normal Summer (MMBtu)				
	1999-00*	2000-01	2001-02	2002-03	2003-04	2000	2001	2002	2003	2004
Firm Sendout	1,654,044	1,808,001	1,877,649	1,943,958	1,991,816	778,822	780,370	781,914	783,458	785,003
Storage Refill	0	0	0	0	0	366,350	366,350	366,350	366,350	366,350
Total	1,654,044	1,808,001	1,877,649	1,943,958	1,991,816	1,145,172	1,146,720	1,148,264	1,149,808	1,151,353
Resources										
Boundary	80,634	80,634	80,634	80,634	80,634	114,276	114,276	114,276	114,276	114,276
Aquila	302,000	302,000	302,000	302,000	302,000	278,200	278,200	278,200	278,200	278,200
Dynegy	302,000	302,000	302,000	302,000	302,000	278,200	278,200	278,200	278,200	278,200
Swing Contract (Engage)	398,338	398,338	398,338	398,338	398,338	0	0	0	0	0
Engage	240,996	240,966	240,966	240,966	240,966	341,544	341,544	341,544	341,544	341,544
Storage	366,350	366,350	366,350	366,350	366,350	0	0	0	0	0
Zone 4 Supply	226,500	226,500	226,500	226,500	226,500	0	0	0	0	0
Peaking	80,000	80,000	80,000	80,000	80,000	0	0	0	0	0
Incremental Market Purchases	0	0	0	0	0	132,952	134,500	136,044	137,588	139,133
Total	1,996,818	1,996,788	1,996,788	1,996,788	1,996,788	1,145,172	1,146,720	1,148,264	1,149,808	1,151,353

*Using actual November and December 1999 Data

4. High Customer Migration Portfolio Analysis

Table 3.6 displays how the Company's supply portfolio could adapt to customer migration over the forecast period. The High Migration Sendout Forecast, where 20 % of the Company's firm load migrates to third party service each year, is used as the basis for the scenario analysis.

During the 1999-2000 gas year, the portfolio would be dispatched in a business as usual manner. However, changes would be made to the late summer contracting process in 2000. As shown on the Table, the Engage contract for 1596 dth/day would not be renewed for the 2000-2001 winter, and a smaller volume of Zone 4 winter supply would be contracted for 2000-2001. This would balance the portfolio for the coming winter.

Because the transportation associated with the expired Engage supply would continue to be under contract, the Company's System would have the ability serve all customers should the competitive supplier fail to deliver or in the event that migrating customers return to default service. Daily and monthly purchases would then be utilized to serve any shortfall in the seasonal supply. Finally, incremental monthly and daily purchases would supplement the portfolio during the summer to refill the storage for the next winter.

The supply portfolio would again have to be balanced prior to the 2001-2002 gas year. The swing supply for 2,638 dth/day would not be needed because the daily swing provided by the TGP Storage contract would suffice under the reduced load. Consequently, as shown on the table, the Swing Contract is reduced to zero in 2001-02. Once again, the transportation associated with the swing supply would continue to be under contract so the system could serve the full firm load if necessary. Refilling storage during the summer would not require the same magnitude of incremental summer purchases as the year before due to customer migration.

As shown on the table, the Aquila and Dynegy supply contracts would be allowed to expire prior to the 2002-2003 gas year. Although the supply is clearly not needed to serve the remaining customers, the transportation may have to be extended at this point. The regulatory and market environment would be assessed at that time to determine the course of action that would be most prudent. From a pure supply perspective, the load could be served adequately with the storage and Boundary contracts supplemented by a small volume of incremental purchases.

During the summer of 2003, incremental purchases would be required to refill the storage for the next season. This is due to the fact all the Company's supply contracts have been allowed to expire at this point. However, the storage contracts would not necessarily have to be filled to their maximum capacity due to customer migration. This keeps the incremental purchases at a reasonable level. In any event, a summer supply contract could be used in lieu of incremental purchases to refill storage contracts.

The winter of 2003-2004 would be served entirely by storage and peaking supplies because of the large volume of third party supplier service. Although it is unclear at this point as to the whether storage and pipeline capacity will have to be retained by the Company for third party suppliers, FG&E will continue to operate its peaking facilities and contract for the appropriate level of liquid supplies each year. By the summer of 2004, customer migration is assumed to be at 100%, and all the Company's supply sources have expired. Table 3.6 clearly shows that FG&E can exit the supply business in a reliable and cost effective manner.

Table 3.6
Comparison of Resources and Requirements
Customer Migration Scenario

	Design Winter with High Customer Migration (MMbtu)					Normal Summer (MMBtu)				
	1999-00*	2000-01	2001-02	2002-03	2003-04	2000	2001	2002	2003	2004
Firm Sendout	1,355,410	1,217,782	889,912	533,072	147,348	647,120	502,851	348,857	179,951	0
Storage Refill	0	0	0	0	0	366,350	366,350	366,350	183,175	0
Total	1,355,410	1,217,782	889,912	533,072	147,348	1,013,470	869,201	715,207	363,126	0
Resources										
Boundary	80,634	80,634	80,634	80,634	0	114,276	114,276	114,276	114,276	0
Aquila	302,000	302,000	302,000	0	0	278,200	278,200	278,200	0	0
Dynegy	302,000	302,000	302,000	0	0	278,200	278,200	278,200	0	0
Swing Contract (Engage)	181,200	181,200	0	0	0	0	0	0	0	0
Engage	240,996	0	0	0	0	341,544	0	0	0	0
Storage	366,350	366,350	366,350	366,350	183,175	0	0	0	0	0
Zone 4 Supply	226,500	181,200	113,250	0	0	0	0	0	0	0
Peaking	80,000	80,000	80,000	80,000	80,000	0	0	0	0	0
Incremental Market Purchases	0	0	0	0	0	1,250	198,525	44,531	248,850	0
Total	1,779,680	1,493,384	1,244,234	526,984	263,175	1,013,470	869,201	715,207	363,126	0

*Using actual November and December 1999 Data

5. Demand Side Management in Relation to Supply Planning

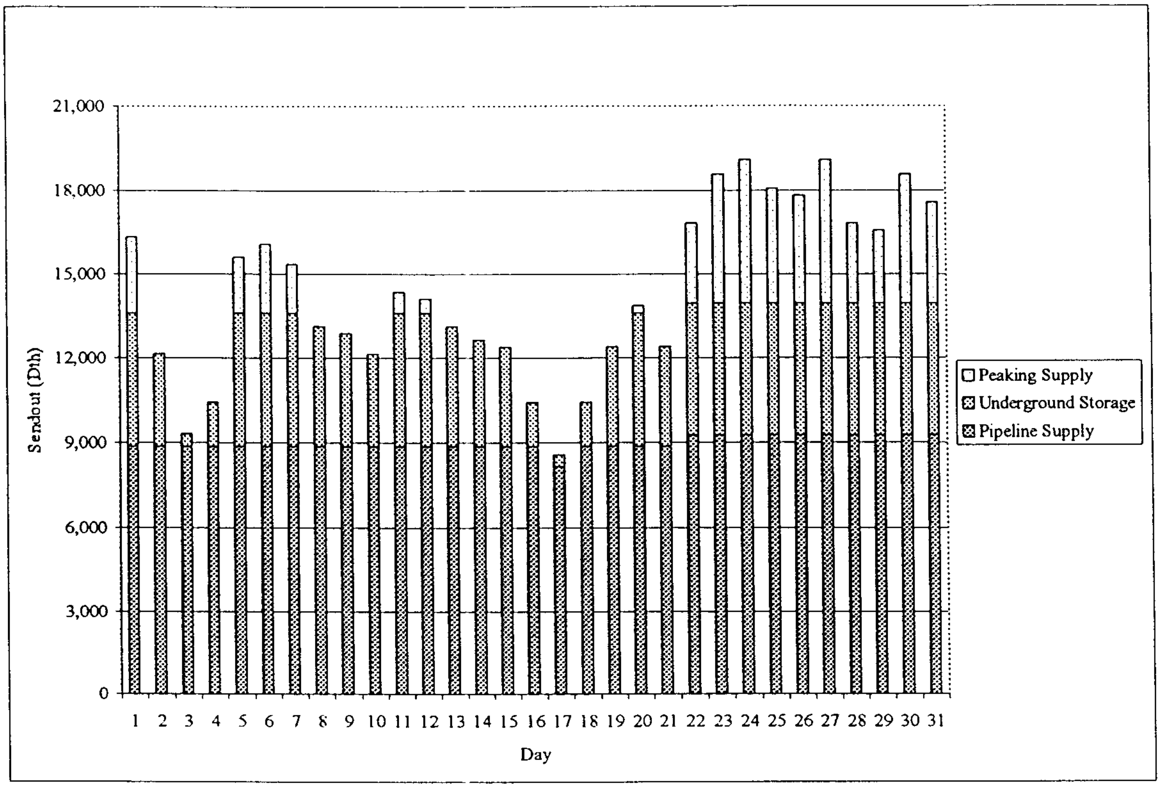
As shown in the High Customer Migration Portfolio Analysis in Section 5. above, the Company has built in the flexibility to adjust portfolio assets to encompass a wide range of conditions including economic load reductions resulting from the Demand Side Management process. Contracted storage, supply, and peaking facilities have either the nominating flexibility or come to the end of their respective contract terms within the planning horizon to ensure system reliability and to integrate the Company's Demand Side Management program with a high degree of efficiency.

6. Cold Snap Analysis

An analysis was performed to establish the ability of gas supplies to meet sendout requirements over ten consecutive extreme cold days. Historical weather data was reviewed and the sendout requirements associated with the ten consecutive coldest days over the past thirty years was used to model this scenario. That analysis assumed the cold snap would occur during the last ten days of an otherwise normal January since, in the context of a cold snap, the last ten days of January would pose the greatest challenge to the FG&E supply system.

Figure 3.6 illustrates the daily sendout requirements and the expected gas supply dispatch for each day of the month in which the cold snap occurs. During this thirty one day period, pipeline supplies would be baseloaded with underground storage and local production dispatched to meet specific daily sendout requirements. During the cold snap, a mixture of LNG and LPG supplies would be used to meet the peaking supply requirement. FG&E's gas supply portfolio would be capable of meeting sendout requirements for a ten-day end of the month cold snap with a reserve margin of approximately ten percent.

Figure 3.6: Normal January System Dispatch with a 10 Day Cold Snap



The dispatch of the company's portfolio during this scenario mirrors the behavior of the Company's supply portfolio dispatch under design cold conditions as well. The cumulative number of degree-days in a design cold January is nearly the same as the number of degree-days used to generate the cold snap analysis. The distribution of the degree-days would simply be less concentrated in the last third of the month. Hence, the Company's supply portfolio is adequate in meeting both the design cold month and the more stringent cold snap criterion.

7. Design Day Analysis

Table 3.7 summarizes the supplies that would be dispatched to meet a design cold day. The Table assumes that the Company would only utilize one of its two peak shaving plants. Operationally, both plants would be run to meet the load, but for planning purposes, one plant is assumed to be inoperable. It is assumed that supplies will be purchased in the market to replace the listed supply contracts that expire over the forecast period.

As the Table shows, the Company has adequate capacity to serve the Design Day requirements. When the capacity of the other peak shaving plant is considered, the resulting capacity margin is approximately 30%.

Table 3.7: Design Day Throughput to Supply Comparison

	1999-00	2000-01	2001-02	2002-03	2003-04
Design Day Throughput	21,255	21,338	21,421	21,505	21,588
Supply Sources					
Boundary	534	534	534	534	534
Aquila	2,000	2,000	2,000	2,000	2,000
Dynegy	2,000	2,000	2,000	2,000	2,000
Swing Contract (Engage)	2,638	2,638	2,638	2,638	2,638
Engage	1,596	1,596	1,596	1,596	1,596
Storage	5,275	5,275	5,275	5,275	5,275
Peaking Supply	7,200	7,200	7,200	7,200	7,200
Incremental Purchases	12	95	178	262	345
Total	21,255	21,338	21,421	21,505	21,588

IV. Demand-Side Management: Energy Efficiency and Market Transformation

A. INTRODUCTION

The Department's Order in Docket No. D.T.E. 98-55 included four demand-side management ("DSM") or energy efficiency ("EE")[11] - related directives as follows:

1. Examine and discuss the viability of offering future DSM programs, including the benefits that market-driven DSM programs may provide to the Company, its customers, and its shareholders, such as alternative financing, equipment replacement, new construction, and load shifting programs.

2. Demonstrate reasonable consideration of DSM programs as resource options to help ensure that FG&E has adequate supplies to meet projected sendout requirements.

3. Develop a mechanism to undertake the comparison of all resources on an equal basis.

4. Demonstrate that the process as a whole enables FG&E to achieve an adequate, least-cost and environmental impact supply plan.

In this section of the Company's IRP compliance filing, FG&E will address each of these directives and will discuss ongoing activities and approaches for identifying, screening, designing, implementing and evaluating demand-side resources on equal footing with gas supply options. The Company plans to file a detailed Gas Energy Efficiency and Market Transformation Plan (Gas EE Plan) with the Department on May 15, 2000. The Gas EE Plan will present detailed information including energy efficiency program descriptions, budgets, cost-effectiveness results, performance objectives and evaluation plans for FG&E's proposed gas EE activities during the four-year period ending October 2003. This plan is being developed utilizing the approaches described herein.

B. EXAMINATION AND DISCUSSION OF THE VIABILITY OF OFFERING FUTURE DSM PROGRAMS

FG&E's Gas Resource Planning Guidelines specify the acquisition of achievable cost-effective demand-side resources through orderly implementation of cost-effective EE programs, and reflects the Company's commitment to pursuing cost-effective EE as a long term economic resource. FG&E is familiar with both the benefits and costs associated with offering future EE programs. As part of its on-going effort to offer customers cost-effective programs that provide the greatest benefit, over the past two years, FG&E has actively participated in numerous regional collaborative EE initiatives. Many of these initiatives have addressed both gas and electric energy efficient technologies and FG&E, being a combination utility, has been exploring the possible synergies that may result from offering complementary gas and electric EE programs.

While the energy distribution industry in the Commonwealth is moving towards retail unbundling and competition, it has become clear that, at least in the near future, the distribution companies will remain responsible for delivery of energy efficiency programs. In fact, electric distribution utilities are required by law to provide general ratepayer-funded EE programs, at specified funding levels, through 2002 and residential low-income EE programs, at specified funding levels, through 2002 and beyond[12]. Although increased support of gas EE activities within FG&E's service territory would reduce Company revenues and put upward pressure on retail rates, the Company believes that some modest level of gas EE spending, coupled with lost base revenue recovery and performance incentive mechanisms may prove beneficial at this time. Contributing to these benefits is the recent availability of a number collaboratively developed, regionally implemented energy efficiency/market transformation-oriented gas EE programs. Such programs allow small distribution utilities the opportunity to participate in well designed and highly effective

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[11] Throughout this section, FG&E has used the terms demand-side management (DSM) and energy efficiency (EE) interchangeably.

energy efficiency efforts (targeted at providing direct energy and cost savings to customers, improving the environment, and building a competitive, self-sustaining energy efficiency infrastructure, etc.) while sharing the burden of administration, implementation and evaluation costs. FG&E is currently participating in, and will soon be joining the Massachusetts Natural Gas Collaborative ("MNGC")[13], and is committed to providing a meaningful level of cost-effective energy efficiency programs to its customers. When determining overall spending levels and deciding amongst numerous potential programs for delivery, FG&E will adhere to the following set of guiding principles (see Table 1). These principles attempt to strike a balance between real and implied benefits and costs associated with a distribution utility's active promotion of gas EE efforts.

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[12] Chapter 164 of the Acts of 1997 - An Act Relative To Restructuring The Electric Utility Industry In The Commonwealth, Regulating The Provision Of Electricity And Other Services, And Promoting Enhanced Consumer Protections Therein.

[13] Member companies include: Baystate Gas, Berkshire Gas, Boston Gas, Colonial Gas, Commonwealth Gas, Essex Gas, and Fall River Gas. The Collaborative's mission is to work with governmental agencies and affiliates to promote energy efficient technologies, create common efficiency programs, educate consumers and promote contractor training and awareness of ever changing natural gas technologies.

TABLE 1

<u>FG&E's Gas EE Guiding Principles</u>

i) *Optimize the level of EE spending (and associated rate increases) required and focus that spending on programs designed to transform energy efficiency markets to permanently overcome market barriers*

- Target programs that are focused on capturing lost opportunities (i.e., major renovations, failed equipment replacements, new construction)
- Provide continued support for low-income customers
- Use and solidify existing market infrastructure when designing and delivering programs so as to encourage – not hinder – development of markets that will be self-sustaining.

ii) *Leverage FG&E's commitment to spending dollars on EE activities that highlight comprehensive customer savings and the Company's commitment to EE*

- Select a portfolio of EE programs and initiatives that optimize cost-effectiveness (i.e., provide comprehensive services that maximize the energy savings for every dollar spent)
- Invest in programs beneficial to the Company (i.e., helping customers in need, encouraging potential new customers to locate in our territory, load management)
- Support high profile projects that can be used as showcases for savings

iii) *Continue to recover lost base revenues and maximize opportunities to earn performance incentives*

- Develop energy savings estimates or other performance criteria that are reasonable, understandable, measurable and achievable.

- Strive to keep administrative and overhead costs to an absolute minimum.

iv) *Build and maintain good relations with regulators and public policy officials*

- Embrace energy efficiency goals as expressed by key regulatory and public policy decision makers. As such, FG&E is developing its May, 2000 Gas EE Plan with the Massachusetts DOER's EE goals clearly in mind. DOER's goals include the following: protect the environment/strengthen the economy; provide funding for low-income customers; allocate program spending equitably; support capture of lost opportunities; provide due emphasis on statewide/regional market transformation; use competitive procurement processes; build competitive markets for energy efficient products and services; balance short/long-run savings from programs; and optimize cost-effectiveness.
- Share (non-proprietary) information and participate in statewide and regional programs where possible.

Alternative financing, equipment replacement, new construction, and load shifting each possess unique benefits and costs and are just a few examples of the types of programs that the Company will be considering for potential implementation. As the Company develops its Gas EE Plan for filing with the Department on May 15, 2000, these guiding principles will be applied to help prioritize and select the most appropriate programs. FG&E is committed to sharing (non-proprietary) information and participating in statewide and regional programs where possible, but, given its small customer base and resource limitations, full participation and representation may not always be possible.

C. CONSIDERATION OF EE PROGRAMS AS RESOURCE OPTIONS

FG&E recognizes the contributions that EE programs can make toward helping the Company meet its supply obligations. In order to prioritize among potential energy efficiency and market transformation ("MT") programs for consideration in the Company's

May, 2000 Gas EE Plan, FG&E is applying a simple screening process. This process begins by first listing potential EE and MT initiatives that are currently being offered or are under consideration by other gas and electric utilities in the region.[14] Once possible program opportunities are identified, specific screening/prioritizing criteria can be applied to help to identify and prioritize those opportunities. Data collection and ranking is then performed and tentative decisions made regarding initiatives and programs for further review and development.

To address this directive, the Company will first present its process for compiling a comprehensive array of EE options for consideration as potential supplements to supplies needed to meet projected sendout requirements. This presentation is followed by a discussion of the criteria being used, and the data collection and ranking activities being conducted by the Company for screening, comparing and selecting EE options within the EE resource category.

1. Process for Compiling a Comprehensive Array of EE Options

The first step in the screening process is to identify commodity and demand-saving technologies and practices that could be potential candidates for FG&E's gas EE initiatives. A list of sample measures to be reviewed by FG&E is presented below.

a) Residential Gas EE Measures

   i) Residential High Efficiency Heating Replacement

   ii) Residential Water Heater Replacement

   iii) Residential New Construction

   iv) TumbleWash/EnergyStar Appliances

[14] Although a more extensive list of potential DSM resource options is available, based on reviews of existing literature and interviews with various DSM advocacy groups, because of the Company's small size, only this targeted list will be used for screening since it is most cost-effective for FG&E to "piggy-back" on similar programs being offered by other utilities wherever possible.

v) Residential Low Income EE and Educational Program[15]

b) Commercial and Industrial Measures

i) Small C&I High Efficiency Heating Replacement

ii) Infrared Heaters

iii) Operation & Maintenance

iv) Large Scale Boiler Systems

v) Custom Installations: (e.g.: HVAC, process systems)

c) Training and Other Measures

i) New Construction Code Training

ii) Contractor Training

iii) Energy Conservation Program

iv) Alternative Financing

v) Load Shifting

This list was compiled mainly from review of current and planned gas EE initiatives actively being considered for implementation in Massachusetts. Sources for information on potential new programs and measures included ideas from the Massachusetts Natural Gas Collaborative, Northeast Energy Efficiency Partnerships (NEEP), Consortium for Energy Efficiency (CEE), EPA, DOE, National Laboratories, E-Source, EPRI, ACEE, AGA, etc. This comprehensive array of EE options is being used as the starting point for systematic screening, comparison and selection process discussed in more detail below.

[15] FG&E filed its Gas Low-Income EE and Educational Program in May 1998. In a letter dated June 30, 1998, the Department granted the Company interim approval to implement the program pending the outcome of Docket No. D.T.E. 98-48/49. (Due to their similar nature, Docket No. D.T.E. 98-48, the Company's 5 Year Electric Energy Efficiency Plan and Docket No. D.T.E. 98-49, the FG&E's Gas Low-Income EE Plan were combined.)

2. Process for Screening, Comparing and Selecting EE Options

In order to compare and select specific gas EE options (from the large array of options identified above) for consideration and potential implementation in FG&E's service territory, the Company's May, 2000 Gas EE Plan will utilize and present results based on a multi-step screening process. The process begins by listing potential energy efficiency and market transformation initiatives that FG&E could get involved with. Next, specific screening criteria are developed along with a screening form. Data collection and ranking is then performed, concluding with tentative decisions on initiatives and programs for inclusion in the Company's Gas EE Plan and ultimate implementation. Each of these steps is discussed below:

a) <u>Identify Potential Measures</u> - The first step in the screening process is to identify gas energy efficiency measures and programs that could be potential candidates for FG&E initiatives. A list of these potential measures was presented above along with a discussion of the process used to compile it.

b) <u>Proposed Screening Criteria for New Measures and Programs</u> - In order to prioritize and screen potential measures, specific screening criteria must be identified. The following criteria have been used by NEEP, the American Council for an Energy-Efficient Economy (ACEEE) in a project for Pacific Gas & Electric Company (PG&E), Boston Edison Company, and are currently being applied by FG&E to help select specific programs for inclusion within its May, 2000 Gas EE Plan.

- Size of commodity and demand savings in 2010
- Likelihood of sustained success by 2003
- Program aligns with FG&E Guiding Principles
- Cost Effectiveness (as defined by the D.T.E. 98-100)

Each of these criteria are discussed in the paragraphs below.

i) *Energy (commodity) and demand-savings in 2010:*

A major objective of FG&E's gas EE programs is to increase the efficient use of energy. All other things being equal, the more efficient, the more attractive the measure. Energy savings for potential EE programs have been estimated based on available data about the technologies, the potential market, and likely market penetration.

ii) *Likelihood of sustained success by 2003:*

Another objective of FG&E's EE programs is to be successful – the programs should be cost-effective and succeed in largely transforming the target market. Achieving success will be more difficult for some initiatives than others given the nature of different markets and the market barriers that need to be overcome. A single rating of the "likelihood of sustained success by 2003" (using a rating of "poor"/"fair"/"good") was used to develop preliminary ratings based on an assessment of the following criteria:

a) Does the program seem practical and doable?

b) Is there interest and enthusiasm among potential allies?

c) Is the infrastructure in place or can it be quickly developed?

d) Does information about the market already exist?

e) Does the initiative coincide with the agenda of others?

f) Has momentum already been developed?

g) Does the concept need another push that is not happening anyway?

h) Do the barriers seem surmountable by 2003?

i) Is there an exit of transition strategy available?

j) Is the measure cost effective to consumers?

k) What is the typical simple payback?

l) Are other non-energy benefits available to help sell the measure?

iii) *Program/Initiative aligns with FG&E's Gas EE Guiding Principles:*

In addition to the primary criteria above, potential resources must be measured against FG&E's Gas EE Guiding Principles, presented in Table 1 above.

iv) *Cost-Effectiveness:*

The cost-effectiveness of potential programs and measures must be assessed using the Department-approved benefit/cost screening methodology as defined in Docket No. D.T.E. 98-100. Only those programs with a Total Resource Cost ratio greater than, or equal to 1.0 will be considered for implementation.

c) Data Forms for the Initial Screening/Prioritizing – To aid in the compilation of the information outlined above, a simple two-page screening form will be completed for each proposed gas EE initiative using readily available information. The intent is to quickly compile the best available information in order to identify measures appropriate for additional investigation. FG&E is relying on data from other Massachusetts utilities, as well as data available through other industry sources to complete this step.

d) Ranking of New Initiatives – Based on the ratings developed from the four screening criteria, preliminary scores and rankings will then be developed. Scores will be developed based on the weights shown below:

- Energy and Demand Savings in 2010 — 25% of Total Score
- Likelihood of Sustained Success by 2003 — 25%

- Aligns with Resource Planning Guidelines 25%

- Cost-Effectiveness 25%

Programs with the maximum score in all categories will receive a total score of 100 points while programs with the minimum score in all categories receive no points. Other programs will receive proportional total scores based on the four criteria and will be ranked, highest to lowest, to assist in determining which programs FG&E should consider for further investigation and potential inclusion in the Company's Gas EE Plan.

e) Preliminary Selections - Based on the rankings discussed above, potential gas EE programs and measures with a score of 50 points or more will generally be selected for additional analysis.

By consistently applying this multi-step process across the comprehensive array of potential EE options listed above, FG&E is confident that all options will be effectively compared against each other and that the resulting selections will yield an excellent portfolio of EE resources for inclusion in the Company's May, 2000 Gas EE Plan.

D. MECHANISM FOR COMPARING ALL RESOURCES ON AN EQUAL BASIS

FG&E recognizes the important role that EE can play in reducing demand for future gas supply side resources. In addition, successful implementation of cost-effective EE programs can provide other benefits to customers, the Company, and society at large. These benefits, however, do not come without cost and a balance must be struck when considering which resources are most appropriate to pursue. To compare EE resources on an equal basis with supply-side options, the Company is utilizing a cost-effectiveness tool designed in accordance with the Department's recent order in Docket No. D.T.E. 98-100. Subject to the budget constraints discussed in Section E, below, FG&E's May, 2000 Gas EE Plan will propose the implementation of a number of energy efficiency initiatives whose benefits are equal to or greater than their costs, as measured by the following factors:

1. Costs

As required in the Department's Order in D.T.E. 98-100, two categories will be used when identifying and quantifying costs for inclusion in the gas EE benefit/cost screening model:

a) Energy System Costs

i) Program Administrative Costs

- payments to vendors for energy efficient equipment and services
- payments to contractors to plan for and/or install energy efficient equipment
- rebates or incentives paid to program participants or vendors for energy efficient equipment and/or services
- costs to check for proper functioning of and maintenance of installed equipment
- costs to market energy efficient equipment and services to customers and to seek participation in energy efficiency programs
- costs to develop, plan, administer, monitor, and evaluate energy efficiency programs

ii) Shareholder Incentives to be earned by program administrators based on their performance in implementing their energy efficiency programs

b) Program Participant Costs

i) all expenses incurred by program participants as a result of their participation in energy efficiency programs, including:

- net cost of the energy efficient equipment (e.g.; incremental participant costs)
- cost to plan for and install the energy efficient equipment
- cost of the energy efficiency services (i.e., inspections for proper equipment functioning)

2. Benefits

As required in the Department's Order in D.T.E. 98-100, two categories will be used when identifying and quantifying benefits for inclusion in the gas EE benefit/cost screening model:

a) Energy System Benefits

i) Avoided Gas Supply Costs - calculated as the product of (1) a program's gas commodity and demand savings, and (2) an avoided gas supply cost factor.[16]

ii) Avoided Transmission and Distribution Costs - calculated as the product of (1) the project's gas commodity and demand savings, and (2) an avoided transmission and/or distribution cost factor.[17]

iii) Avoided Projected Compliance costs (i.e., environmental compliance costs that are reasonably projected to be incurred in the future because of rules and/or regulatory requirements that are not currently in effect, but which are projected to take effect in the foreseeable future) - these costs have already been factored into the Avoided Gas Supply Cost discussed above.

iv) Low Income Benefits - accounting for quantifiable cost savings to gas distribution companies that reasonably result from the implementation of energy efficiency programs targeted to low-income customers. These cost savings include:

- Reduced account write-offs
- Reduced arrearages, late payments, and late payment administrative costs
- Reduced shut-off and reconnect charges

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[16] The avoided gas supply cost factors being used in FG&E's cost-effectiveness screening model are based on the weighted average of the gas supply costs as published in a report entitled *"Avoided Energy-Supply Costs for Demand-Side-Management Screening in Massachusetts"* prepared for the Avoided Energy Supply Component Study Group, by Resource Insight and Synapse Energy Economics, dated July 30, 1999. Per the Department's Order in 98-100, these factors will be updated every two years, or as necessitated by changing market conditions.

- Reduced credit and collection expenses

b) Program Participant Benefits

i) Participant Non-Resource Benefits, including:

- Reduced costs for operation and maintenance associated with efficient equipment or practices

- The value of longer equipment replacement cycles and/or productivity improvements associated with efficient equipment

- Reduced environmental and safety costs (i.e., those for changes in a waste stream or disposal of lamp ballasts or ozone-depleting chemicals)

- Reduced disconnections for inability to pay

ii) Participant Resource Benefits - to account for reduced consumption of oil, water, sewage disposal, and other resources as a result of the implementation of energy efficiency programs and calculated as the product of (1) the reduction in consumption of oil, water, sewage disposal, and other resources, and (2) avoided cost factors for each of these resources.[18]

3. Discount Rate

In accordance with the Department's Order in D.T.E. 98-100, benefits and costs will be stated in present value terms, using a discount rate equal to the yield on 30 year US Treasury Bonds available at the close of trading on the first business day of each year.

Results from the Company's cost-effectiveness screening efforts will be presented in FG&E's May, 2000 Gas EE Plan. Utilization of the avoided cost factors and benefit/cost

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[17] These avoided cost factors will be based on the weighted average of any transmission or distribution costs of the gas distribution companies participating in the specific program under evaluation.

[18] These avoided cost factors will be uniform across all gas distribution companies participating in the specific program under evaluation.

screening mechanism discussed above, will ensure that potential EE efforts are compared effectively against all resource on an equal basis.

E. ADEQUACY DEMONSTRATION

As discussed in Sections A through E above, EE is an important part of the Company's integrated resource planning (IRP) process. FG&E is committed to implementing a meaningful number of gas EE programs over the remainder of the 1998 - 2003 planning horizon. The challenge in this process has been to determine an overall budget level for spending on cost-effective gas EE initiatives that strikes a balance in providing customer, company, shareholder and environmental benefits against resulting upward pressure on rates and erosion of Company revenues. In this final EE Section, the Company discusses its approach to establishing an overall budget for gas EE programs.

FG&E's May, 2000 Gas EE Plan will identify the Company's proposed overall funding levels for gas EE programs in each of the next three years. This filing will include detailed program descriptions, implementation and evaluation plans, and budgets for individual programs targeting residential, low income, multifamily, and commercial/industrial customers. In establishing the Company's overall gas EE program budget, FG&E will consider three separate factors. Following is a brief discussion on each of these three factors:

TABLE 2
Comparison of Various Gas DSM Funding Levels
and the Resulting Energy Efficiency Charges and Bill Impacts

Sector	% of Revenues	Projected Funding	Estimated Gas EEC	Typical Bill Impact $'s	Typical Bill Impact %
Residential	0.50%	$ 46,000	$ 0.0033	$ 0.21	0.39%
GS Small (Heat & Non-Heat)	0.50%	$ 8,200	$ 0.0032	$ 0.56	0.40%
GS Medium (Heat & Non-Heat)	0.50%	$ 14,050	$ 0.0032	$ 5.25	0.44%
GS Large (Heat & Non-Heat)	0.50%	$ 12,100	$ 0.0032	$ 66.92	0.50%
Total		$ 80,350			
Residential	1.00%	$ 92,000	$ 0.0066	$ 0.41	0.78%
GS Small (Heat & Non-Heat)	1.00%	$ 16,400	$ 0.0064	$ 1.11	0.79%
GS Medium (Heat & Non-Heat)	1.00%	$ 28,100	$ 0.0064	$ 10.50	0.87%
GS Large (Heat & Non-Heat)	1.00%	$ 24,200	$ 0.0064	$ 133.83	0.99%
Total		$ 160,700			
Residential	1.50%	$ 138,000	$ 0.0099	$ 0.62	1.17%
GS Small (Heat & Non-Heat)	1.50%	$ 24,600	$ 0.0096	$ 1.67	1.19%
GS Medium (Heat & Non-Heat)	1.50%	$ 42,150	$ 0.0096	$ 15.75	1.31%
GS Large (Heat & Non-Heat)	1.50%	$ 36,300	$ 0.0096	$ 200.75	1.49%
Total		$ 241,050			

1. Upward Pressure on Rates and Reduced Revenue Impacts

As stated in the Company's 1998 Integrated Gas Resource Plan, FG&E's market for gas sales continues to be characterized by little or no growth in most sectors, declining average use per customer and historically, retail firm prices which are among the lowest in Massachusetts. Under these conditions, not only are energy efficiency improvements and fuel switching occurring, but an increase in retail rates to support EE initiatives would increase competitive pressures and thereby result in further deterioration of market and environmental conditions. This situation has existed now for some time, and it is expected that this situation will not change significantly in the next few years. Table 2 shows the impact that various EE budget levels will have on rates:

When determining the budget level for gas EE, FG&E will consider the resulting rate impact. In addition, by their nature, energy savings from successful delivery of gas EE programs, will reduce the Company's revenues. FG&E will continue to recover these lost revenues through the Energy Efficiency Charge Reconciliation ("R_{EEC}") portion of its Department-approved Local Distribution Adjustment Clause. In its May, 2000 Gas EE Plan, FG&E will provide further details and a sample calculation of the R_{EEC}, along with calculations of the impact on a typical bill for each of its major rate classes.

2. Consistency with Spending Levels of Other Massachusetts Gas Utilities

Through discussion with other Massachusetts gas distribution utilities and review of publicly available documents, the Company has determined that typical gas utility funding of EE ranges from less that 1% to approximately 1.5% of annual natural gas distribution revenues. This information will provide valuable insights when determining the appropriate EE budget level for FG&E.

3. Budget Levels Sufficient to Effectively Deliver Meaningful Value to Customers

A final consideration when determining FG&E's EE budget level, is the need to have sufficient budgets for meaningful and effective implementation of a range of gas EE measures. It is entirely possible that, given the Company's small size, adequate funding for certain programs may not be achievable (i.e., after paying the Company's share of administration and related support for a hypothetical regional initiative, insufficient funds would remain to provide a meaningful number of customer rebates). In addition, FG&E must be quite careful when making its gas EE program selection decisions. The Company must be certain that it is effectively funding a mix of cost-effective residential, low-income, multi-family, and commercial/industrial energy efficiency initiatives that can provide true benefits to a broad range of customers within its service territory while achieving other key goals and guiding principles.

FG&E is confident that it can develop an overall budget level which will support successful implementation of a number of cost-effective gas EE programs, while enabling the

Company to achieve a viable, least-cost resource plan. The Company looks forward to finalizing the details of its Gas EE Plan for filing with the Department by May 15th, based on the identification, screening, selection, and funding strategies presented above.

V. Conclusion

FG&E believes it has presented a resource plan that will allow it to meet the requirements of it s firm customers in a least cost and reliable fashion. The Company believes it has complied with the requirement placed on it by the Department in its last IRP order. Therefore, FG&E respectfully request approval of the Integrated Resource Plan presented herein.

APPENDIX

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Table DD
EFSC (4/86)

Fitchburg Gas and Electric Light Company
Filing Date: May 1, 2000

DEGREE DAY DATA

Split Year (11/1-10/31)	Heating Season	Non Heating Season	Total Split Year	Coldest Degree Day
11/94-10/95	4,599	1,459	6,058	63
11/95-10/96	5,389	1,591	6,980	64
11/96-10/97	4,977	1,696	6,673	65
11/97-10/98	4,639	1,269	5,908	53
11/98-10/99	4,650	1,436	6,086	57
Normal Year	5,092	1,567	6,659	62
Design	5,595	1,839	7,270	70

	Time Period	Method Used	Recurrence Expectancy
Normal Year	35 Years	Normal Dist	N/A
Design Year	35 Years	Normal Dist	1 in 30
Design Day	35 Years	Normal Dist	1 in 30

Table FA **Fitchburg Gas and Electric Light Company**

EFSC (4/86) Filing Date: May 1, 2000

FORECAST ACCURACY

Total Split-Year Normalized Firm Sendout

(Percent Difference)

Forecast Prepared for Five-Year Period Starting: 1994/95

Split Year (11/1-10/31)	Actual Normalized Sendout	1994-95	1995-96	1996-97	1997-98	1998-99
1994-95	2,350,163	2,418,171 2.89%				
1995-96	2,410,432		2,482,698 3.00%			
1996-97	2,440,168			2,518,399 3.21%		
1997-98	2,440,519				2,555,446 4.71%	
1998-99	2,437,081					2,592,585 6.38%

SENDOUT BY CLASS

TOTAL RESIDENTIAL CLASS

Historical Period (MMbtus)

Split Year (11/1-10/31)	Average No. of Custs	ACTUAL		NORMAL		Heat Use Per Cust Per DD	Daily Base Load per Cust
		Heating Season	Non-Heating Season	Heating Season	Non-Heating Season		
1994-95	13,603	792,907	418,924	865,079	429,414	0.01075	23.61
1995-96	13,551	922,072	448,864	888,613	440,304	0.01085	27.12
1996-97	13,566	854,397	454,026	879,862	429,738	0.01047	26.21
1997-98	13,772	822,454	390,282	879,816	440,196	0.01096	23.87
1998-99	13,489	824,228	381,447	893,760	407,249	0.01096	22.33

Forecast Period (MMbtus)

Split Year (11/1-10/31)	Average No. of Custs	NORMAL		DESIGN		Heat Use Per Cust Per DD	Daily Base Load per Cust
		Heating Season	Non-Heating Season	Heating Season	Non-Heating Season		
1999-00*	13,492	862,896	418,565	942,602	429,505	0.01096	21.99
2000-01	13,461	862,647	420,257	943,708	430,009	0.01101	22.02
2001-02	13,445	865,076	422,538	947,194	431,597	0.01106	22.10
2002-03	13,418	865,658	423,095	948,071	431,997	0.01110	22.12
2003-04	13,404	865,157	423,786	948,229	432,069	0.01112	22.12

** 1999-00 has 2 months of actual data and 10 months of forecast data.*

Table G-3 (a)
Mass EFSC (4/86)

Fitchburg Gas and Electric Light Company
Filing Date: May 1, 2000

SENDOUT BY CLASS

COMMERCIAL & INDUSTRIAL HEATING ONLY

Historical Period (MMbtus)

Split Year (11/1-10/31)	Average No. of Custs	ACTUAL		NORMAL		Heat Use Per Cust Per DD	Daily Base Load per Cust
		Heating Season	Non-Heating Season	Heating Season	Non-Heating Season		
1994-95	946	309,064	119,975	340,829	123,539	0.0681	62.93
1995-96	946	404,815	123,886	389,477	120,212	0.0688	74.64
1996-97	960	364,864	128,426	377,127	121,329	0.0711	71.71
1997-98	927	341,508	98,186	367,173	115,292	0.0730	61.26
1998-99	981	348,454	105,197	382,152	112,755	0.0745	60.85

Forecast Period (MMbtus)

Split Year (11/1-10/31)	Average No. of Custs	NORMAL		DESIGN		Heat Use Per Cust Per DD	Daily Base Load per Cust
		Heating Season	Non-Heating Season	Heating Season	Non-Heating Season		
1999-00*	994	392,119	121,853	381,614	173,886	0.0681	63.19
2000-01	1,017	402,597	129,856	395,240	180,095	0.0688	65.46
2001-02	1,039	425,153	138,625	418,400	190,647	0.0711	69.32
2002-03	1,058	446,153	145,398	438,922	199,998	0.0730	72.73
2003-04	1,075	462,668	151,675	455,750	207,667	0.0745	75.53

** 1999-00 has 2 months of actual data and 10 months of forecast data.*

SENDOUT BY CLASS
COMMERCIAL & INDUSTRIAL HEATING & OTHER

Historical Period (MMbtus)

Split Year (11/1-10/31)	Average No. of Custs	ACTUAL Heating Season	ACTUAL Non-Heating Season	NORMAL Heating Season	NORMAL Non-Heating Season	Heat Use Per Cust Per DD	Daily Base Load per Cust
1994-95	334	275,877	222,713	294,681	227,855	0.1012	858.00
1995-96	340	302,928	241,250	295,654	239,952	0.0954	959.19
1996-97	347	309,825	284,403	315,931	285,309	0.1177	922.05
1997-98	364	343,948	260,181	359,309	277,937	0.1013	1,049.93
1998-99	356	301,476	235,473	319,257	245,425	0.1087	918.04

Forecast Period (MMbtus)

Split Year (11/1-10/31)	Average No. of Custs	NORMAL Heating Season	NORMAL Non-Heating Season	DESIGN Heating Season	DESIGN Non-Heating Season	Heat Use Per Cust Per DD	Daily Base Load per Cust
1999-00*	366	356,486	272,136	447,968	204,121	0.1047	1,021.99
2000-01	378	368,563	294,873	471,957	215,051	0.1018	1,078.59
2001-02	389	413,979	322,078	522,780	238,209	0.1046	1,196.65
2002-03	399	460,538	347,366	572,937	261,064	0.1066	1,313.46
2003-04	407	497,413	371,168	615,305	280,369	0.1087	1,412.11

** 1999-00 has 2 months of actual data and 10 months of forecast data.*

SENDOUT BY CLASS
COMMERCIAL & INDUSTRIAL, FIRM

Historical Period (MMbtus)

Split Year (11/1-10/31)	Average No. of Custs	ACTUAL Heating Season	ACTUAL Non-Heating Season	NORMAL Heating Season	NORMAL Non-Heating Season	Heat Use Per Cust Per DD	Daily Base Load per Cust
1994-95	1,279	584,941	342,688	635,510	351,394	0.1694	920.94
1995-96	1,286	707,743	365,137	685,131	360,164	0.1641	1,033.83
1996-97	1,307	674,689	412,829	693,058	406,638	0.1888	993.76
1997-98	1,291	685,456	358,367	726,482	393,229	0.1743	1,111.19
1998-99	1,337	649,930	340,669	701,409	358,180	0.1831	978.89

Forecast Period (MMbtus)

Split Year (11/1-10/31)	Average No. of Custs	NORMAL Heating Season	NORMAL Non-Heating Season	DESIGN Heating Season	DESIGN Non-Heating Season	Heat Use Per Cust Per DD	Daily Base Load per Cust
1999-00*	1,360	748,605	393,989	829,582	378,006	0.1729	1,085.18
2000-01	1,395	771,160	424,728	867,197	395,146	0.1706	1,144.05
2001-02	1,427	839,132	460,703	941,179	428,857	0.1757	1,265.97
2002-03	1,457	906,691	492,763	1,011,858	461,062	0.1797	1,386.19
2003-04	1,482	960,081	522,844	1,071,055	488,036	0.1831	1,487.64

** 1999-00 has 2 months of actual data and 10 months of forecast data.*

Table G-4 (a) **Fitchburg Gas and Electric Light Company**

Filing Date: May 1, 2000

SENDOUT BY CLASS
INTERRUPTIBLE

Historical Period (MMbtus)

Split Year (11/1-10/31)	ACTUAL	
	Heating Season	**Non-Heating Season**
1994-95	357,184	510,905
1995-96	191,892	785,231
1996-97	224,984	413,574
1997-98	302,953	386,454
1998-99	299,384	497,410

Forecast Period (MMbtus)

Split Year (11/1-10/31)	NORMAL	
	Heating Season	**Non-Heating Season**
1999-00*		
2000-01		
2001-02	**Not Forecast**	
2002-03		
2003-04		

** 1999-00 has 2 months of actual data and 10 months of forecast data.*

SENDOUT BY CLASS
SALES FOR RESALE (Firm)

Historical Period (MMbtus)

Split Year (11/1-10/31)	ACTUAL		NORMAL	
	Heating Season	Non- Heating Season	Heating Season	Non- Heating Season
1994-95				
1995-96				
1996-97		None		
1997-98				
1998-99				

Forecast Period (MMbtus)

Split Year (11/1-10/31)	NORMAL		DESIGN	
	Heating Season	Non- Heating Season	Heating Season	Non- Heating Season
1999-00*				
2000-01				
2001-02		None		
2002-03				
2003-04				

** 1999-00 has 2 months of actual data and 10 months of forecast data.*

SENDOUT BY CLASS
COMPANY USE

Historical Period (MMbtus)

Split Year (11/1-10/31)	ACTUAL		NORMAL	
	Heating Season	Non- Heating Season	Heating Season	Non- Heating Season
1994-95				
1995-96				
1996-97	None			
1997-98				
1998-99				

Forecast Period (MMbtus)

Split Year (11/1-10/31)	NORMAL		DESIGN	
	Heating Season	Non- Heating Season	Heating Season	Non- Heating Season
1999-00*				
2000-01				
2001-02	None			
2002-03				
2003-04				

** 1999-00 has 2 months of actual data and 10 months of forecast data.*

TOTAL FIRM COMPANY SENDOUT

(includes Company Use and Unaccounted for Gas, Reduced for FT)

Historical Sendout (MMbtus)

Split Year (11/1-10/31)	ACTUAL		NORMAL		Actual Peak Day
	Heating Season	Non-Heating Season	Heating Season	Non-Heating Season	
1994-95	1,474,486	746,215	1,596,818	753,345	16,205
1995-96	1,734,738	764,953	1,659,063	751,369	17,653
1996-97	1,629,532	818,961	1,649,097	791,070	17,871
1997-98	1,566,091	732,351	1,665,118	775,401	14,322
1998-99	1,604,967	724,205	1,702,013	735,068	18,317

Forecast Period (MMbtus)

Split Year (11/1-10/31)	NORMAL		DESIGN		Normal Peak Day
	Heating Season	Non-Heating Season	Heating Season	Non-Heating Season	
1999-00*	1,422,633	672,968	1,484,677	693,504	16,311
2000-01	1,398,870	656,637	1,492,920	676,620	15,427
2001-02	1,364,984	641,042	1,456,734	660,509	14,534
2002-03	1,322,250	617,707	1,411,112	636,433	13,633
2003-04	1,261,371	590,518	1,346,140	608,384	12,724

** 1999-00 has 2 months of actual data and 10 months of forecast data.*

Table G-14

EXISTING GAS MANUFACTURING AND STORAGE FACILITIES (Mmbtu)

Type of Facility	Location	Anticipated Retirement Date	Last Actual Split Year Total Sendout (MMBtu)	Last Actual Split Year Max 24 Hr. Sendout (MMBtu)	Maximum Daily Desigh Capacity (MMBtu)	Storage Capacity in MMBtu
LNG Storage	Westminster, MA	None	28,307	2,877	7,200	4,556
Propane-Air	Lunenberg, MA	None	8,250	2,764	10,900	29,937

Fitchburg Gas and Electric Light Company
Rate Design Conversion Factors
Test Year Weather Normalized Billing Month Data (excludes Billing Correction , Heat Rate and Calendarization)

NEW Residential into OLD CLASSES

Meters	Meters	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec
GR - Residential	GR	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
GS1 - Heating Only	GS1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
GS2 - Heat & Other	GS2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total Meters		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Therms	Therms	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec
GR - Residential	GR	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
GS1 - Heating Only	GS1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
GS2 - Heat & Other	GS2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total Therms		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: DTE 98-51, Volume II, Rate Design Workpapers, pp. 34-37.

Fitchburg Gas and Electric Light Company
Rate Design Conversion Factors
Test Year Weather Normalized Billing Month Data (excludes Billing Correction , Heat Rate and Calendarization)

G41-Small LLF into OLD CLASSES

		Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec
Meters	**Meters**												
GR - Residential	GR	0.2%	0.2%	0.2%	0.2%	0.2%	0.3%	0.3%	0.3%	0.3%	0.2%	0.2%	0.2%
GS1 - Heating Only	GS1	88.8%	88.8%	89.0%	89.2%	89.2%	90.4%	89.5%	89.8%	90.1%	90.0%	89.2%	88.5%
GS2 - Heat & Other	GS2	11.0%	11.0%	10.7%	10.5%	10.6%	9.3%	10.2%	9.9%	9.7%	9.8%	10.6%	11.3%
Total Meters		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

		Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec
Therms	**Therms**												
GR - Residential	GR	0.5%	0.7%	0.7%	0.9%	1.6%	2.5%	3.4%	2.7%	2.3%	1.2%	0.7%	0.6%
GS1 - Heating Only	GS1	86.2%	86.0%	86.7%	85.5%	80.9%	81.5%	70.0%	77.7%	76.5%	79.5%	82.7%	84.5%
GS2 - Heat & Other	GS2	13.3%	13.3%	12.6%	13.5%	17.5%	15.9%	26.6%	19.6%	21.3%	19.3%	16.6%	14.9%
Total Therms		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: DTE 98-51, Volume II, Rate Design Workpapers, pp. 34-37.

Fitchburg Gas and Electric Light Company
Rate Design Conversion Factors
Test Year Weather Normalized Billing Month Data (excludes Billing Correction , Heat Rate and Calendarization)

G51-Small HLF into OLD CLASSES

		Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec
Meters	**Meters**												
GR - Residential	GR	2.8%	2.7%	2.7%	2.7%	2.6%	2.7%	2.2%	2.2%	2.2%	2.3%	2.5%	2.5%
GS1 - Heating Only	GS1	33.1%	33.7%	33.3%	33.7%	35.9%	39.8%	40.6%	41.4%	39.9%	37.5%	34.8%	33.7%
GS2 - Heat & Other	GS2	64.1%	63.5%	64.0%	63.6%	61.5%	57.6%	57.2%	56.4%	57.9%	60.2%	62.7%	63.9%
Total Meters		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

		Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec
Therms	**Therms**												
GR - Residential	GR	6.3%	7.5%	7.2%	7.1%	6.4%	5.2%	5.3%	4.8%	4.5%	4.3%	6.0%	5.7%
GS1 - Heating Only	GS1	31.4%	33.0%	29.3%	30.9%	27.8%	30.0%	25.8%	28.8%	26.8%	24.8%	30.1%	34.2%
GS2 - Heat & Other	GS2	62.2%	59.5%	63.5%	62.0%	65.8%	64.9%	69.0%	66.4%	68.7%	70.9%	63.9%	60.1%
Total Therms		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: DTE 98-51, Volume II, Rate Design Workpapers, pp. 34-37.

Fitchburg Gas and Electric Light Company
Rate Design Conversion Factors
Test Year Weather Normalized Billing Month Data (excludes Billing Correction , Heat Rate and Calendarization)

G42-Medium LLF into OLD CLASSES

Meters	Meters	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec
GR - Residential	GR	18.3%	18.6%	18.4%	18.5%	18.3%	17.5%	15.8%	16.8%	16.1%	16.9%	18.6%	18.3%
GS1 - Heating Only	GS1	66.3%	66.3%	66.1%	65.9%	67.4%	69.9%	72.8%	73.9%	71.5%	68.3%	66.9%	66.3%
GS2 - Heat & Other	GS2	15.4%	15.1%	15.5%	15.6%	14.3%	12.6%	11.4%	9.2%	12.4%	14.8%	14.5%	15.4%
Total Meters		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Therms	Therms	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec
GR - Residential	GR	14.2%	15.5%	16.0%	19.1%	27.6%	37.9%	45.3%	41.6%	29.5%	23.6%	18.2%	15.1%
GS1 - Heating Only	GS1	68.4%	68.0%	66.1%	64.4%	58.2%	50.8%	46.7%	49.4%	57.7%	59.1%	64.1%	65.8%
GS2 - Heat & Other	GS2	17.5%	16.4%	17.9%	16.4%	14.2%	11.3%	8.0%	9.0%	12.8%	17.3%	17.7%	19.2%
Total Therms		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: DTE 98-51, Volume II, Rate Design Workpapers, pp. 34-37.

Fitchburg Gas and Electric Light Company
Rate Design Conversion Factors
Test Year Weather Normalized Billing Month Data (excludes Billing Correction , Heat Rate and Calendarization)

G52-Medium HLF into OLD CLASSES

		Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec
Meters	**Meters**												
GR - Residential	GR	15.3%	15.7%	15.7%	15.1%	14.9%	15.7%	12.9%	13.5%	13.5%	14.4%	14.9%	14.8%
GS1 - Heating Only	GS1	17.6%	16.9%	15.7%	17.4%	17.2%	20.5%	20.4%	20.8%	20.8%	18.9%	17.2%	17.0%
GS2 - Heat & Other	GS2	67.1%	67.5%	68.7%	67.4%	67.8%	63.9%	66.7%	65.6%	65.6%	66.7%	67.8%	68.2%
Total Meters		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

		Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec
Therms	**Therms**												
GR - Residential	GR	11.1%	10.8%	11.9%	11.2%	10.1%	7.6%	6.1%	6.3%	6.3%	8.0%	10.5%	10.6%
GS1 - Heating Only	GS1	19.5%	21.4%	19.2%	18.0%	19.3%	20.3%	13.2%	17.5%	18.9%	16.8%	19.1%	19.2%
GS2 - Heat & Other	GS2	69.4%	67.8%	68.8%	70.8%	70.6%	72.1%	80.7%	76.2%	74.9%	75.2%	70.4%	70.2%
Total Therms		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: DTE 98-51, Volume II, Rate Design Workpapers, pp. 34-37.

Fitchburg Gas and Electric Light Company
Rate Design Conversion Factors
Test Year Weather Normalized Billing Month Data (excludes Billing Correction , Heat Rate and Calendarization)

G43-Large LLF into OLD CLASSES

		Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec
Meters	**Meters**												
GR - Residential	GR	9.1%	9.1%	9.1%	9.1%	9.1%	8.3%	8.3%	7.7%	7.1%	8.3%	9.1%	10.0%
GS1 - Heating Only	GS1	36.4%	36.4%	36.4%	36.4%	36.4%	41.7%	41.7%	46.2%	42.9%	41.7%	36.4%	40.0%
GS2 - Heat & Other	GS2	54.5%	54.5%	54.5%	54.5%	54.5%	50.0%	50.0%	46.2%	50.0%	50.0%	54.5%	50.0%
Total Meters		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

		Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec
Therms	**Therms**												
GR - Residential	GR	11.5%	11.1%	11.2%	14.7%	19.7%	26.7%	35.8%	38.9%	29.3%	15.4%	11.1%	12.3%
GS1 - Heating Only	GS1	42.4%	43.2%	41.2%	39.1%	40.3%	29.2%	12.5%	17.7%	21.8%	38.7%	42.6%	43.7%
GS2 - Heat & Other	GS2	46.2%	45.7%	47.6%	46.2%	39.9%	44.1%	51.7%	43.3%	48.9%	45.9%	46.3%	44.0%
Total Therms		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: DTE 98-51, Volume II, Rate Design Workpapers, pp. 34-37.

Fitchburg Gas and Electric Light Company
Rate Design Conversion Factors
Test Year Weather Normalized Billing Month Data (excludes Billing Correction , Heat Rate and Calendarization)

G53-Large HLF into OLD CLASSES

		Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec
Meters	**Meters**												
GR - Residential	GR	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
GS1 - Heating Only	GS1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
GS2 - Heat & Other	GS2	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Total Meters		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

		Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec
Therms	**Therms**												
GR - Residential	GR	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
GS1 - Heating Only	GS1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
GS2 - Heat & Other	GS2	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Total Therms		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: DTE 98-51, Volume II, Rate Design Workpapers, pp. 34-37.

The Impact of Calendar Data On Billing Cycle / Metered Sales Data

Developed to Convert Weather Data from Calendar Basis to Billing Cycle Basis

	DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	DAYS	DEC	JAN	FEB
PRIOR MONTH (assume December)	1	•																															1	97%	**3%**	
	2	•	•																														2	94%	**6%**	
	3	•	•	•																													3	90%	**10%**	
	4	•	•	•	•																												4	87%	**13%**	
	5	•	•	•	•	•																											5	84%	**16%**	
	6	•	•	•	•	•	•																										6	81%	**19%**	
	7	•	•	•	•	•	•	•																									7	77%	**23%**	
	8	•	•	•	•	•	•	•	•																								8	74%	**26%**	
	9	•	•	•	•	•	•	•	•	•																							9	71%	**29%**	
	10	•	•	•	•	•	•	•	•	•	•																						10	68%	**32%**	
	11	•	•	•	•	•	•	•	•	•	•	•																					11	65%	**35%**	
	12	•	•	•	•	•	•	•	•	•	•	•	•																				12	61%	**39%**	
	13	•	•	•	•	•	•	•	•	•	•	•	•	•																			13	58%	**42%**	
	14	•	•	•	•	•	•	•	•	•	•	•	•	•	•																		14	55%	**45%**	
	15	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•																	15	52%	**48%**	
	16	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•																16	48%	**52%**	
	17	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•															17	45%	**55%**	
	18	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•														18	42%	**58%**	
	19	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•													19	39%	**61%**	
	20	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•												20	35%	**65%**	
	21	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•											21	32%	**68%**	
	22	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•										22	29%	**71%**	
	23	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•									23	26%	**74%**	
	24	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								24	23%	**77%**	
	25	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•							25	19%	**81%**	
	26	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•						26	16%	**84%**	
	27	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•					27	13%	**87%**	
	28	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•				28	10%	**90%**	
	29	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•			29	6%	**94%**	
	30	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		30	3%	**97%**	
	31	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	31	0%	**100%**	
CURRENT (BILLING) MONTH (assume January)	1	X	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	30		**97%**	3%
	2		X	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	29		**94%**	6%
	3			X	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	28		**90%**	10%
	4				X	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	27		**87%**	13%
	5					X	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	26		**84%**	16%
	6						X	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	25		**81%**	19%
	7							X	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	24		**77%**	23%
	8								X	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	23		**74%**	26%
	9									X	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	22		**71%**	29%
	10										X	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	21		**68%**	32%
	11											X	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	20		**65%**	35%
	12												X	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	19		**61%**	39%
	13													X	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	18		**58%**	42%
	14														X	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	17		**55%**	45%
	15															X	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	16		**52%**	48%
	16																X	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	15		**48%**	52%
	17																	X	•	•	•	•	•	•	•	•	•	•	•	•	•	•	14		**45%**	55%
	18																		X	•	•	•	•	•	•	•	•	•	•	•	•	•	13		**42%**	58%
	19																			X	•	•	•	•	•	•	•	•	•	•	•	•	12		**39%**	61%
	20																				X	•	•	•	•	•	•	•	•	•	•	•	11		**35%**	65%
	21																					X	•	•	•	•	•	•	•	•	•	•	10		**32%**	68%
	22																						X	•	•	•	•	•	•	•	•	•	9		**29%**	71%
	23																							X	•	•	•	•	•	•	•	•	8		**26%**	74%
	24																								X	•	•	•	•	•	•	•	7		**23%**	77%
	25																									X	•	•	•	•	•	•	6		**19%**	81%
	26																										X	•	•	•	•	•	5		**16%**	84%
	27																											X	•	•	•	•	4		**13%**	87%
	28																												X	•	•	•	3		**10%**	90%
	29																													X	•	•	2		**6%**	94%
	30																														X	•	1		**3%**	97%
	31																															X	0		**0%**	100%

X Meter reading dates. • Represents a day of actual consumption reflected in metered data.
Columns show how weather data each day is allocated between months to match Billing Cycle.

Example of Model Used to Weather Normalize Historic Class Sales Data

	WEATHER (Wor-Bed) Bill Coincident HDD			RESIDENTIAL SALES WEATHER NORMALIZATION									
MON	ACT	NORM	VAR	Custs	Actual Therms	Actual Th/Cust	Base Th/Cust	Base Therms	Space Th/Cust	Space Th/Cust/DD	Adjust Th/Cust	Adjust Therms	Normal Therms
Jan-83	1,054	1,200	(146)	13,775	1,904,925	138.3	23.3	321,276	115.0	0.109	15.952	219,743	2,124,668
Feb-83	1,142	1,195	(53)	13,786	1,645,300	119.3	23.3	321,532	96.0	0.084	4.461	61,502	1,706,802
Mar-83	882	998	(115)	14,117	1,856,304	131.5	23.3	329,252	108.2	0.123	14.155	199,823	2,056,127
Apr-83	751	748	3	13,838	1,529,405	110.5	23.3	322,745	87.2	0.116	(0.340)	(4,707)	1,524,698
May-83	403	417	(14)	13,988	993,544	71.0	23.3	326,244	47.7	0.118	1.639	22,930	1,016,474
Jun-83	197	157	40	13,893	586,162	42.2	23.3	324,028	18.9	0.096	(3.833)	(53,252)	532,910
Jul-83	24	33	(9)	13,788	365,845	26.5	23.3	321,579	3.2	0.133	1.194	16,467	382,312
Aug-83	18	12	6	13,769	321,136	23.3	23.3	321,136	-	-	-	-	321,136
Sep-83	43	77	(35)	13,851	354,480	25.6	23.3	323,048	2.3	0.053	1.830	25,349	379,829
Oct-83	257	305	(48)	13,881	545,203	39.3	23.3	323,748	16.0	0.062	2.984	41,423	586,626
Nov-83	627	592	35	13,964	1,103,385	79.0	23.3	325,684	55.7	0.089	(3.084)	(43,067)	1,060,318
Dec-83	898	918	(20)	13,930	1,645,631	118.1	23.3	324,891	94.8	0.106	2.064	28,755	1,674,386
Jan-84	1,283	1,200	83	14,040	2,356,670	167.9	22.6	316,701	145.3	0.113	(9.347)	(131,232)	2,225,438
Feb-84	1,131	1,195	(65)	13,994	2,169,862	155.1	22.6	315,664	132.5	0.117	7.575	106,010	2,275,872
Mar-84	1,011	998	13	14,008	1,967,053	140.4	22.6	315,980	117.9	0.117	(1.519)	(21,275)	1,945,778
Apr-84	822	748	74	13,991	1,638,835	117.1	22.6	315,596	94.6	0.115	(8.495)	(118,848)	1,519,987
May-84	448	417	31	14,023	924,908	66.0	22.6	316,318	43.4	0.097	(3.003)	(42,104)	882,804
Jun-84	169	157	12	13,974	583,207	41.7	22.6	315,213	19.2	0.114	(1.360)	(19,007)	564,200
Jul-84	19	33	(15)	13,798	369,323	26.8	22.6	311,243	4.2	0.227	3.318	45,775	415,098
Aug-84	12	12	(0)	13,813	311,581	22.6	22.6	311,581	-	-	-	-	311,581
Sep-84	97	77	20	13,784	384,991	27.9	22.6	310,927	5.4	0.055	(1.089)	(15,012)	369,979
Oct-84	323	305	18	13,915	618,345	44.4	22.6	313,882	21.9	0.068	(1.211)	(16,854)	601,491
Nov-84	519	592	(73)	13,918	1,019,877	73.3	22.6	313,949	50.7	0.098	7.166	99,732	1,119,609
Dec-84	864	918	(54)	13,966	1,492,907	106.9	22.6	315,032	84.3	0.098	5.252	73,347	1,566,254

ANNUAL Annual Totals - Calendar Year

1983	6,297	6,653	(356)	13,882	12,851,320	13,366.287
1984	6,696	6,653	43	13,935	13,837,559	13,798.091

Base Load and Weather-Sensitive Component Used to Normalize Historic Throughput

Firm Throughput - Daily Base Load Component

YEAR	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*
1983	2,452	2,749	1,637	2,291	2,210	2,331	1,994	2,171	2,258	2,156	1,727	3,047
1984	3,092	1,511	1,090	3,534	2,565	2,648	2,223	2,261	2,662	2,518	2,898	2,573
1985	2,149	2,035	2,273	2,146	2,632	2,623	2,237	2,384	2,523	2,371	2,371	770
1986	2,335	3,535	2,346	2,383	2,533	2,462	2,368	2,406	2,286	2,328	1,689	4,441
1987	3,322	2,839	2,055	932	1,997	2,283	2,137	2,296	2,353	2,510	1,579	(124)
1988	1,472	2,552	2,532	3,132	3,050	3,270	1,890	2,076	2,160	1,797	2,836	2,513
1989	1,265	2,790	1,177	1,435	2,124	2,214	2,000	2,154	2,304	2,264	1,968	2,202
1990	2,202	2,890	3,785	2,348	2,104	2,551	2,395	2,032	2,194	2,084	2,433	1,767
1991	2,890	3,785	2,348	2,104	2,551	2,395	2,032	2,194	2,084	2,433	1,767	1,666
1992	1,724	1,557	3,120	1,687	2,001	2,219	2,121	2,331	2,053	1,566	2,163	2,227
1993	1,873	2,920	1,354	1,828	2,710	2,415	0	2,196	2,253	2,244	3,007	1,672
1994	3,646	2,440	2,206	2,941	2,606	2,432	2,031	2,178	2,566	2,442	2,503	1,670
1995	2,167	2,360	1,150	1,044	2,514	2,356	2,058	2,191	2,313	2,420	3,322	1,153
1996	3,163	3,075	2,636	2,398	2,225	2,318	2,041	2,114	2,111	2,329	2,762	3,153
1997	3,988	4,147	2,089	1,313	2,348	2,381	2,245	2,301	2,484	2,444	2,147	4,341
1998	3,865	3,116	3,033	2,871	2,517	2,594	2,279	2,210	2,428	2,422	3,826	2,226
1999	4,371	4,105	6,531	2,642	2,454	2,275	2,096	2,270	2,245	2,409	2,533	3,107

Firm Throughput - W.S. Per Degree Day

YEAR	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*
1983	245	244	261	198	157	75	45	19	80	185	230	226
1984	228	270	284	130	173	68	2	89	65	157	184	229
1985	264	262	239	216	123	63	76	0	71	153	217	287
1986	263	219	238	198	170	108	31	45	89	151	242	168
1987	209	231	235	279	223	102	0	52	52	114	226	293
1988	266	233	235	189	145	39	68	(0)	74	188	179	224
1989	262	16	249	212	125	68	47	32	101	178	237	256
1990	256	222	198	227	195	122	82	31	44	111	185	230
1991	222	198	227	195	122	82	31	44	111	185	230	258
1992	263	266	213	219	145	92	11	45	113	190	206	239
1993	248	232	268	243	70	100	0	0	121	190	197	261
1994	234	258	249	171	137	105	67	44	46	153	217	265
1995	257	257	274	273	155	58	42	57	97	171	202	289
1996	239	246	243	226	171	24	46	35	126	171	221	225
1997	229	208	264	270	167	113	(20)	110	89	201	254	210
1998	222	233	237	179	161	86	259	78	88	167	171	252
1999	224	210	169	177	113	64	36	13	74	187	232	238

Regression Output for Number of Residential Customers (RES_CUST)

LS // Dependent Variable is LOG(RES_CUST)
Date: 04/09/00 Time: 13:53
Sample(adjusted): 1984 1999
Included observations: 16 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.425407	0.968984	-1.471032	0.1693
LOG(POP(-1))	1.195564	0.145932	8.192616	0.0000
LOG(HSTOCK)	0.596054	0.228281	2.611053	0.0242
TREND	-0.018181	0.001735	-10.47896	0.0000
DUM95	-0.012378	0.005986	-2.067630	0.0630

R-squared	0.967228	Mean dependent var	9.545453
Adjusted R-squared	0.955311	S.D. dependent var	0.025289
S.E. of regression	0.005346	Akaike info criterion	-10.21253
Sum squared resid	0.000314	Schwarz criterion	-9.971096
Log likelihood	63.99723	F-statistic	81.16370
Durbin-Watson stat	1.857934	Prob(F-statistic)	0.000000

Regression Output for Use Per Residential Customer (RES_PER)

LS // Dependent Variable is LOG(RES_PER)
Date: 04/09/00 Time: 11:32
Sample(adjusted): 1984 1999
Included observations: 16 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.061761	0.253274	31.83024	0.0000
LOG(RGAS(-1))	-0.100680	0.029627	-3.398252	0.0053
LOG(MFGEM/POP)	0.318888	0.055004	5.797567	0.0001
DUM96	0.039308	0.011545	3.404878	0.0052

R-squared	0.814408	Mean dependent var	6.866318
Adjusted R-squared	0.768010	S.D. dependent var	0.022273
S.E. of regression	0.010728	Akaike info criterion	-8.857493
Sum squared resid	0.001381	Schwarz criterion	-8.664346
Log likelihood	52.15693	F-statistic	17.55266
Durbin-Watson stat	2.047443	Prob(F-statistic)	0.000110

Regression Output for GS1 (Heating Only) Customers (GS1_CUST)

LS // Dependent Variable is LOG(GS1_CUST)
Date: 04/06/00 Time: 14:59
Sample(adjusted): 1984 1999
Included observations: 16 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-12.64244	5.518177	-2.291054	0.0409
LOG(GS1_CUST(-1))	0.519268	0.175982	2.950695	0.0121
LOG(POP)	2.441391	0.995319	2.452873	0.0304
TREND	-0.008928	0.004266	-2.093035	0.0583

R-squared	0.966936	Mean dependent var	6.783822
Adjusted R-squared	0.958671	S.D. dependent var	0.117006
S.E. of regression	0.023787	Akaike info criterion	-7.264928
Sum squared resid	0.006790	Schwarz criterion	-7.071781
Log likelihood	39.41641	F-statistic	116.97900
Durbin-Watson stat	1.829488	Prob(F-statistic)	0.000000

Regression Output for GS1 (Heating Only) Class Sales (GS1_SLS)

LS // Dependent Variable is LOG(GS1_SLS)
Date: 04/09/00 Time: 11:11
Sample: 1983 1999
Included observations: 17

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	13.90221	0.868154	16.01353	0.0000
LOG(CGAS)	-0.291099	0.115216	-2.526551	0.0253
LOG(SVCEM)	0.593386	0.090308	6.570674	0.0000
DUM84	-0.104814	0.034206	-3.064151	0.0091

R-squared	0.959244	Mean dependent var	15.26619
Adjusted R-squared	0.949839	S.D. dependent var	0.129629
S.E. of regression	0.029033	Akaike info criterion	-6.876341
Sum squared resid	0.010958	Schwarz criterion	-6.680291
Log likelihood	38.32695	F-statistic	101.9907
Durbin-Watson stat	1.840188	Prob(F-statistic)	0.000000

Output of Breusch-Godfrey Serial Correlation LM Test for (GS1_CUST)

Breusch-Godfrey Serial Correlation LM Test:

Obs*R-squared	0.00000606	Probability	0.998035

Test Equation:
LS // Dependent Variable is RESID
Date: 04/06/00 Time: 15:07

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.000674	5.772949	-0.000117	0.9999
LOG(GS1_CUST(-1))	-0.000136	0.195452	-0.000694	0.9995
LOG(POP)	0.000240	1.046187	0.000229	0.9998
TREND	0.000002	0.004569	0.000452	0.9996
RESID(-1)	0.000741	0.36288	0.002042	0.9984

R-squared	0.000000	Mean dependent var	0.000000
Adjusted R-squared	-0.363636	S.D. dependent var	0.021276
S.E. of regression	0.024845	Akaike info criterion	-7.139928
Sum squared resid	0.006790	Schwarz criterion	-6.898494
Log likelihood	39.41640	F-statistic	0.000001
Durbin-Watson stat	1.829889	Prob(F-statistic)	1.000000

Regression Output for GS2 (Heating and Other) Customers (GS2_CUST)

LS // Dependent Variable is LOG(GS2_CUST)
Date: 04/09/00 Time: 11:18
Sample(adjusted): 1984 1999
Included observations: 16 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.245925	0.459025	4.892816	0.0004
LOG(RESOIL(-1))	0.068231	0.013209	5.165342	0.0002
LOG(INCPC(-1))	0.336106	0.041832	8.034647	0.0000
DUM88	-0.027675	0.010244	-2.701449	0.0193

R-squared	0.874869	Mean dependent var	5.836904
Adjusted R-squared	0.843587	S.D. dependent var	0.024954
S.E. of regression	0.009869	Akaike info criterion	-9.024345
Sum squared resid	0.001169	Schwarz criterion	-8.831198
Log likelihood	53.49174	F-statistic	27.96661
Durbin-Watson stat	1.776832	Prob(F-statistic)	0.000011

Regression Output for GS2 (Heating and Other) Class Sales (GS2_SLS)

LS // Dependent Variable is LOG(GS2_SLS)
Date: 04/09/00 Time: 11:23
Sample(adjusted): 1985 1999
Included observations: 15 after adjusting endpoints
Convergence achieved after 5 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	17.21477	1.298720	13.25518	0.0000
LOG(IGAS(-1))	-0.575312	0.296231	-1.942108	0.0782
TREND	0.045943	0.016909	2.717154	0.0200
AR(1)	0.657421	0.149416	4.399944	0.0011

R-squared	0.912926	Mean dependent var	15.32707
Adjusted R-squared	0.889179	S.D. dependent var	0.222306
S.E. of regression	0.074005	Akaike info criterion	-4.984058
Sum squared resid	0.060245	Schwarz criterion	-4.795245
Log likelihood	20.09636	F-statistic	38.44311
Durbin-Watson stat	1.843171	Prob(F-statistic)	0.000004

Exponential Smoothing Output of Sendout to Sales Relationship

Date: 04/16/00 Time: 19:39
Sample: 1990:01 1999:12
Included observations: 120
Method: Holt-Winters Additive Seasonal
Original Series: SO_TO_SLS
Forecast Series: SO_TO_SLS_F

Parameters:	Alpha		0.0100
	Beta		0.0300
	Gamma		0.0100
Sum of Squared Residuals			1.034208
Root Mean Squared Error			0.092835

End of Period Levels:	Mean		0.040584
	Trend		-0.000408
	Seasonals:	1999:01	-0.016440
		1999:02	-0.113256
		1999:03	-0.103097
		1999:04	-0.253171
		1999:05	-0.241921
		1999:06	-0.213806
		1999:07	-0.042725
		1999:08	0.114263
		1999:09	0.147244
		1999:10	0.341941
		1999:11	0.267150
		1999:12	0.113817

ANNUAL_COLD

Fitchburg Gas and Electric Light Company
Analysis of Worcester/Bedford Weather Data
Summary of Design Cold Year Degree Days Analysis

Description	<----- 35 Year Averages -----> Deg Days	Std Dev	Count
Annual Average Degree Days	6,659	333.6	35
t-statistic (95% Confidence Level) =			2.035
DESIGN COLD			
1 in 20 DESIGN YEAR	7,207		
1 in 30 DESIGN YEAR	7,270		
1 in 40 DESIGN YEAR	7,312		
1 in 50 DESIGN YEAR	7,344		
1 in 100 DESIGN YEAR	7,435		

Fitchburg Gas and Electric Light Company
Analysis of Worcester/Bedford Weather Data
Total Degree Days Analysis
Monthly Data

Description	<----- 35 Year Averages -----> Deg Days	Std Dev	Count
January	1,258	130.33	35
February	1,074	108.85	35
March	919	82.77	35
April	566	73.21	35
May	267	59.28	35
June	71	31.29	35
July	9	7.72	35
August	27	16.15	35
September	163	36.38	35
October	464	74.95	35
November	744	78.91	35
December	1,097	121.96	35
Annual Gas Year	6,659	333.61	35

DESIGN_DAY_COLD

Fitchburg Gas and Electric Light Company
Analysis of Worcester/Bedford Weather Data
Summary of Design Cold Daily Degree Days Analysis

Description	Max	<----- 35 Year Averages -----> Avg Max	Std Dev	Count
Annual Degree Days	73	62.5	3.9	35
t-statistic (95% Confidence Level) =		2.035		
DESIGN COLD				
1 in 20 DESIGN DAY		69		
1 in 30 DESIGN DAY		70		
1 in 40 DESIGN DAY		70		
1 in 50 DESIGN DAY		71		
1 in 100 DESIGN DAY		72		

Fitchburg Gas and Electric Light Company
Analysis of Worcester/Bedford Weather Data
Summary of Design Cold Daily Degree Days Analysis
Monthly Data

Description	Max	<----- 35 Year Averages -----> Avg Max	Std Dev	Count
January	70	59.46	6.03	35
February	67	56.26	5.16	35
March	58	46.14	5.25	35
April	47	32.14	4.64	35
May	29	21.11	3.69	35
June	18	11.77	3.11	35
July	10	4.00	2.59	35
August	16	7.40	3.78	35
September	28	17.63	3.36	35
October	36	28.49	3.81	35
November	50	40.20	4.25	35
December	73	54.03	5.74	35
Maximum	73	62.49	3.89	35

WINTER_COLD

Fitchburg Gas and Electric Light Company
Analysis of Worcester/Bedford Weather Data
Summary of Winter Degree Days Analysis
Estimate of Mean Analysis

Description	Deg Days (35 Year Averages)	Std Dev (35 Year Averages)	Count (35 Year Averages)
Total Winter Degree Days	5,092	274.64	35
t-statistic (95% Confidence Level) =		2.035	
LOW ESTIMATE OF MEAN		4,997	
HIGH ESTIMATE OF MEAN		5,186	

Fitchburg Gas and Electric Light Company
Analysis of Worcester/Bedford Weather Data
Summary of Design Cold Winter Degree Days Analysis

Description	Deg Days (35 Year Averages)	Std Dev (35 Year Averages)	Count (35 Year Averages)
Total Winter Degree Days	5,092	274.64	35
t-statistic (95% Confidence Level) =		2.035	
DESIGN COLD			
1 in 20 DESIGN WINTER		5,543	
1 in 30 DESIGN WINTER		5,595	
1 in 40 DESIGN WINTER		5,630	
1 in 50 DESIGN WINTER		5,656	
1 in 100 DESIGN WINTER		5,730	

Estimation of Base Load and Weather-Sensitive Components - January Only

LS // Dependent Variable is JANMMBTU
Date: 04/17/00 Time: 14:42
Sample(adjusted): 1 527
Included observations: 527 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2477.455	153.1783	16.17367	0.0000
JANDD	247.7194	3.763726	65.81759	0.0000

R-squared	0.891908	Mean dependent var	12249.440
Adjusted R-squared	0.891702	S.D. dependent var	2628.697
S.E. of regression	865.0702	Akaike info criterion	13.52941
Sum squared resid	3.93E+08	Schwarz criterion	13.54560
Log likelihood	-4310.780	F-statistic	4331.955
Durbin-Watson stat	0.921625	Prob(F-statistic)	0.000000

	Base Load Component		Wthr-Sens Component	
January	= C	2477.455	=JANDD	247.7194

Estimation of Base Load and Weather-Sensitive Components - February Only

LS // Dependent Variable is FEBMMBTU
Date: 04/17/00 Time: 14:43
Sample(adjusted): 1 480
Included observations: 480 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2764.426	146.0590	18.92678	0.0000
FEBDD	237.8836	3.810751	62.42434	0.0000

R-squared	0.890738	Mean dependent var	11571.08
Adjusted R-squared	0.890509	S.D. dependent var	2504.199
S.E. of regression	828.6241	Akaike info criterion	13.44369
Sum squared resid	3.28E+08	Schwarz criterion	13.46108
Log likelihood	-3905.576	F-statistic	3896.798
Durbin-Watson stat	1.223565	Prob(F-statistic)	0.000000

	Base Load Component		Wthr-Sens Component	
February	= C	2764.426	=FEBDD	237.8836

Estimation of Base Load and Weather-Sensitive Components - March Only

LS // Dependent Variable is MARMMBTU
Date: 04/17/00 Time: 14:44
Sample(adjusted): 1 527
Included observations: 527 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2373.478	141.3051	16.79683	0.0000
MARDD	241.0974	4.547182	53.02128	0.0000

R-squared	0.842638	Mean dependent var	9515.360
Adjusted R-squared	0.842338	S.D. dependent var	2468.84
S.E. of regression	980.2934	Akaike info criterion	13.77949
Sum squared resid	5.05E+08	Schwarz criterion	13.79569
Log likelihood	-4376.677	F-statistic	2811.256
Durbin-Watson stat	0.750491	Prob(F-statistic)	0.000000

	Base Load Component		Wthr-Sens Component	
March	= C	2373.478	=MARDD	241.0974

Estimation of Base Load and Weather-Sensitive Components - April Only

LS // Dependent Variable is APRMMBTU
Date: 04/17/00 Time: 14:52
Sample(adjusted): 1 510
Included observations: 510 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2163.347	92.9743	23.26824	0.0000
APRDD	212.5329	4.584486	46.35915	0.0000

R-squared	0.808819	Mean dependent var	6169.80
Adjusted R-squared	0.808443	S.D. dependent var	1769.036
S.E. of regression	774.2581	Akaike info criterion	13.30772
Sum squared resid	3.05E+08	Schwarz criterion	13.32433
Log likelihood	-4115.128	F-statistic	2149.171
Durbin-Watson stat	1.356157	Prob(F-statistic)	0.000000

	Base Load Component		Wthr-Sens Component	
April	= C	2163.347	=APRDD	212.5329

Estimation of Base Load and Weather-Sensitive Components - May Only

LS // Dependent Variable is MAYMMBTU
Date: 04/17/00 Time: 15:00
Sample(adjusted): 1 527
Included observations: 527 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2411.543	40.52783	59.50337	0.0000
MAYDD	152.1146	3.690924	41.21315	0.0000

R-squared	0.763888	Mean dependent var	3749.112
Adjusted R-squared	0.763439	S.D. dependent var	1145.668
S.E. of regression	557.2250	Akaike info criterion	12.64973
Sum squared resid	1.63E+08	Schwarz criterion	12.66592
Log likelihood	-4078.983	F-statistic	1698.524
Durbin-Watson stat	1.119107	Prob(F-statistic)	0.000000

	Base Load Component		Wthr-Sens Component	
May	= C	2411.543	=MAYDD	152.1146

Estimation of Base Load and Weather-Sensitive Components - June Only

LS // Dependent Variable is JUNMMBTU
Date: 04/17/00 Time: 15:01
Sample(adjusted): 1 510
Included observations: 510 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2430.685	20.3774	119.2832	0.0000
JUNDD	87.9786	4.747733	18.53065	0.0000

R-squared	0.403325	Mean dependent var	2627.86
Adjusted R-squared	0.402151	S.D. dependent var	507.5826
S.E. of regression	392.4665	Akaike info criterion	11.94882
Sum squared resid	7.82E+07	Schwarz criterion	11.96542
Log likelihood	-3768.607	F-statistic	343.3851
Durbin-Watson stat	1.084388	Prob(F-statistic)	0.000000

	Base Load Component		Wthr-Sens Component	
June	= C	2430.685	=JUNDD	87.9786

Estimation of Base Load and Weather-Sensitive Components - July Only

LS // Dependent Variable is JULMMBTU
Date: 04/17/00 Time: 15:02
Sample(adjusted): 1 527
Included observations: 527 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2104.341	13.31441	158.0498	0.0000
JULDD	35.7296	11.09447	3.220488	0.0014

R-squared	0.019373	Mean dependent var	2115.528
Adjusted R-squared	0.017505	S.D. dependent var	297.6838
S.E. of regression	295.0669	Akaike info criterion	11.37819
Sum squared resid	4.57E+07	Schwarz criterion	11.39439
Log likelihood	-3743.934	F-statistic	10.37154
Durbin-Watson stat	1.370192	Prob(F-statistic)	0.001359

	Base Load Component		Wthr-Sens Component	
July	= C	2104.341	=JULDD	35.7296

Estimation of Base Load and Weather-Sensitive Components - August Only

LS // Dependent Variable is AUGMMBTU
Date: 04/17/00 Time: 15:03
Sample(adjusted): 1 527
Included observations: 527 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2233.533	14.1590	157.7463	0.0000
AUGDD	33.6735	6.30228	5.343062	0.0000

R-squared	0.051573	Mean dependent var	2261.52
Adjusted R-squared	0.049767	S.D. dependent var	309.7888
S.E. of regression	301.9818	Akaike info criterion	11.42452
Sum squared resid	4.79E+07	Schwarz criterion	11.44072
Log likelihood	-3756.142	F-statistic	28.54831
Durbin-Watson stat	1.463617	Prob(F-statistic)	0.000000

	Base Load Component		Wthr-Sens Component	
August	= C	2233.533	=AUGDD	33.6735

Estimation of Base Load and Weather-Sensitive Components - September Only

LS // Dependent Variable is SEPMMBTU
Date: 04/17/00 Time: 15:04
Sample(adjusted): 1 510
Included observations: 510 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2299.033	23.60485	97.39667	0.0000
SEPDD	91.5203	3.050764	29.99914	0.0000

R-squared	0.639191	Mean dependent var	2793.602
Adjusted R-squared	0.638481	S.D. dependent var	634.5191
S.E. of regression	381.5138	Akaike info criterion	11.89221
Sum squared resid	7.39E+07	Schwarz criterion	11.90881
Log likelihood	-3754.172	F-statistic	899.9483
Durbin-Watson stat	1.123523	Prob(F-statistic)	0.000000

	Base Load Component		Wthr-Sens Component	
September	= C	2299.033	=SEPDD	91.5203

Estimation of Base Load and Weather-Sensitive Components - October Only

LS // Dependent Variable is OCTMMBTU
Date: 04/17/00 Time: 15:07
Sample(adjusted): 1 527
Included observations: 527 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2355.75	67.8662	34.71169	0.0000
OCTDD	167.6465	4.043536	41.46037	0.0000

R-squared	0.766039	Mean dependent var	4875.54
Adjusted R-squared	0.765593	S.D. dependent var	1432.011
S.E. of regression	693.3162	Akaike info criterion	13.08676
Sum squared resid	2.52E+08	Schwarz criterion	13.10295
Log likelihood	-4194.142	F-statistic	1718.963
Durbin-Watson stat	0.885882	Prob(F-statistic)	0.000000

	Base Load Component		Wthr-Sens Component	
October	= C	2355.750	=OCTDD	167.6465

Estimation of Base Load and Weather-Sensitive Components - November Only

LS // Dependent Variable is NOVMMBTU
Date: 04/17/00 Time: 15:09
Sample(adjusted): 1 510
Included observations: 510 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2317.337	106.0774	21.84573	0.0000
NOVDD	220.1934	4.019918	54.77559	0.0000

R-squared	0.855203	Mean dependent var	7796.698
Adjusted R-squared	0.854918	S.D. dependent var	2092.702
S.E. of regression	797.1019	Akaike info criterion	13.36588
Sum squared resid	3.23E+08	Schwarz criterion	13.38248
Log likelihood	-4129.958	F-statistic	3000.365
Durbin-Watson stat	1.106812	Prob(F-statistic)	0.000000

	Base Load Component		Wthr-Sens Component	
November	= C	2317.337	=NOVDD	220.1934

Estimation of Base Load and Weather-Sensitive Components - December Only

LS // Dependent Variable is DECMMBTU
Date: 04/17/00 Time: 15:10
Sample(adjusted): 1 527
Included observations: 527 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2183.315	131.2348	16.63671	0.0000
DECDD	248.3220	3.619724	68.60246	0.0000

R-squared	0.899642	Mean dependent var	10869.40
Adjusted R-squared	0.899451	S.D. dependent var	2498.745
S.E. of regression	792.3374	Akaike info criterion	13.35376
Sum squared resid	3.30E+08	Schwarz criterion	13.36996
Log likelihood	-4264.497	F-statistic	4706.298
Durbin-Watson stat	1.026027	Prob(F-statistic)	0.000000

	Base Load Component		Wthr-Sens Component	
December	= C	2183.315	=DECDD	248.3220

Estimation of Base Load and Weather-Sensitive Components - Single Regression

LS // Dependent Variable is MMBTU
Date: 04/18/00 Time: 11:31
Sample: 1 6209
Included observations: 6209

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2477.455	120.0641	20.63443	0.0000
FEB	286.9703	169.4115	1.693924	0.0903
MAR	-103.9771	154.8172	-0.671612	0.5019
APR	-314.1081	145.0690	-2.165232	0.0304
MAY	-65.91261	129.7979	-0.507810	0.6116
JUN	-46.76995	125.1193	-0.373803	0.7086
JUL	-373.1144	123.9013	-3.011384	0.0026
AUG	-243.9220	124.2020	-1.963914	0.0496
SEP	-178.4218	127.1826	-1.402879	0.1607
OCT	-121.7054	137.1887	-0.887139	0.3750
NOV	-160.1180	150.1925	-1.066085	0.2864
DEC	-294.1400	164.4026	-1.789144	0.0736
HDD	247.7194	2.950082	83.97034	0.0000
FEBDD	-9.835767	4.292656	-2.291301	0.0220
MARDD	-6.621964	4.312252	-1.535616	0.1247
APRDD	-35.18651	4.982191	-7.062457	0.0000
MAYDD	-95.60478	5.373523	-17.79183	0.0000
JUNDD	-159.7408	8.716966	-18.32527	0.0000
JULDD	-211.9898	25.66502	-8.259871	0.0000
AUGDD	-214.0459	14.45515	-14.80759	0.0000
SEPDD	-156.1991	6.172676	-25.30492	0.0000
OCTDD	-80.07288	4.933708	-16.22976	0.0000
NOVDD	-27.52601	4.516238	-6.094898	0.0000
DECDD	0.602578	4.277667	0.140866	0.8880

R-squared	0.972708	Mean dependent var	6360.460
Adjusted R-squared	0.972606	S.D. dependent var	4096.769
S.E. of regression	678.0590	Akaike info criterion	13.04233
Sum squared resid	2.84E+09	Schwarz criterion	13.06835
Log likelihood	-49276.09	F-statistic	9584.163
Durbin-Watson stat	0.871633	Prob(F-statistic)	0.000000

	Base Load		Wthr-Sens Component	
	Coeff. Used	Calc Value	Coeff. Used	Calc Value
January	= C	2477.455	=HDD	247.7194
February	= C + FEB	2764.425	=HDD+FEBDD	237.8836
March	= C + MAR	2373.478	=HDD+MARDD	241.0974
April	= C + APR	2163.347	=HDD+APRDD	212.5329
May	= C + MAY	2411.542	=HDD+MAYDD	152.1146
June	= C + JUN	2430.685	=HDD+JUNDD	87.9786
July	= C + JUL	2104.341	=HDD+JULDD	35.7296
August	= C + AUG	2233.533	=HDD+AUGDD	33.6735
September	= C + SEP	2299.033	=HDD+SEPDD	91.5203
October	= C + OCT	2355.750	=HDD+OCTDD	167.6465
November	= C + NOV	2317.337	=HDD+NOVDD	220.1934
December	= C + DEC	2183.315	=HDD+DECDD	248.3220

Estimation and Calculation of Peak Day Base Load and Weather-Sensitive Components

LS // Dependent Variable is PEAK_MMBTU
Date: 04/30/00 Time: 16:24
Sample: 1983 1999
Included observations: 17

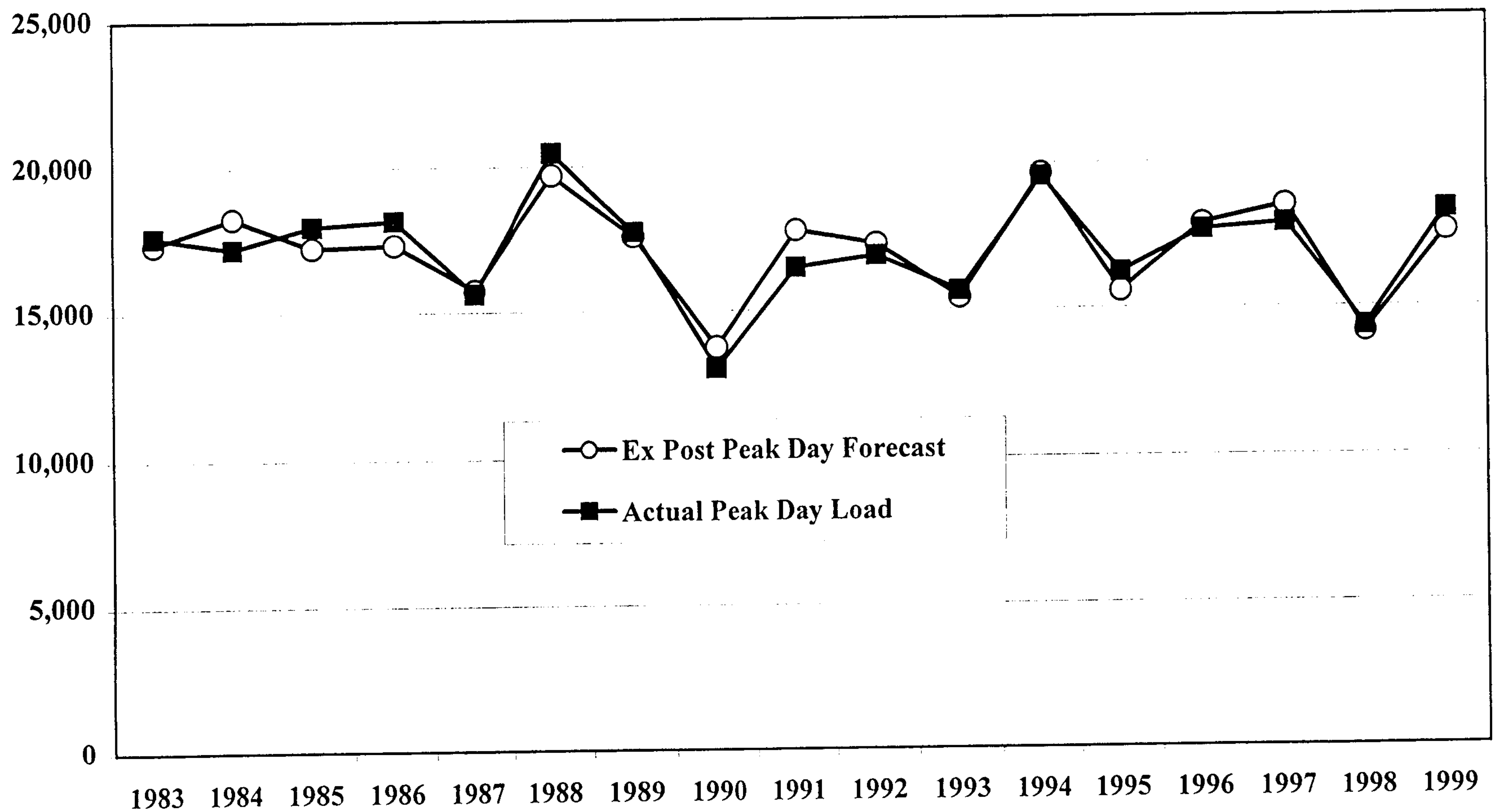
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	314.4484	1848.068	0.17015	0.8673
HDD	277.7178	29.31691	9.472954	0.0000
ANNTREND	83.32829	37.33041	2.232183	0.0425

R-squared	0.86715	Mean dependent var	17090.350
Adjusted R-squared	0.848172	S.D. dependent var	1804.01
S.E. of regression	702.9350	Akaike info criterion	13.26931
Sum squared resid	6.92E+06	Schwarz criterion	13.41635
Log likelihood	-133.911	F-statistic	45.69113
Durbin-Watson stat	1.71568	Prob(F-statistic)	0.000001

Base Load Component	Weather-Sens Component	
= C + (ANNTREND * Period)	=HDD	277.7178

Year	Period	Base Load	Peak Day HDD	Wthr-Sens Load	Ex Post Peak	Actual Peak	%Var.
1983	1	398	61	16,941	17,339	17,601	-1.5%
1984	2	481	64	17,774	18,255	17,193	6.2%
1985	3	564	60	16,663	17,228	17,965	-4.1%
1986	4	648	60	16,663	17,311	18,152	-4.6%
1987	5	731	54	14,997	15,728	15,607	0.8%
1988	6	814	68	18,885	19,699	20,464	-3.7%
1989	7	898	60	16,663	17,561	17,710	-0.8%
1990	8	981	46	12,775	13,756	13,043	5.5%
1991	9	1064	60	16,663	17,727	16,445	7.8%
1992	10	1148	58	16,108	17,255	16,839	2.5%
1993	11	1231	51	14,164	15,395	15,608	-1.4%
1994	12	1314	66	18,329	19,644	19,541	0.5%
1995	13	1398	51	14,164	15,561	16,205	-4.0%
1996	14	1481	59	16,385	17,866	17,653	1.2%
1997	15	1564	61	16,941	18,505	17,871	3.5%
1998	16	1648	45	12,497	14,145	14,322	-1.2%
1999	17	1731	57	15,830	17,561	18,317	-4.1%
2000	18	1814	70	19,440	21,255		
2001	19	1898	70	19,440	21,338		
2002	20	1981	70	19,440	21,421		
2003	21	2064	70	19,440	21,505		
2004	22	2148	70	19,440	21,588		

Comparison of Ex Post Peak Day Forecasts and Actual Peak Day Load



Residential Class - Core Customers and Therm Sales

RES_CUST	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Jan	14,481	14,387	14,195	14,072	13,706	13,579	13,537	13,832	13,582	13,472	13,330	13,214	13,078	12,965
Feb	14,481	14,338	14,184	13,999	13,647	13,573	13,535	14,110	13,584	13,563	13,421	13,304	13,167	13,053
Mar	14,474	14,307	14,178	13,964	13,616	13,579	13,520	13,877	13,575	13,478	13,337	13,220	13,085	12,971
Apr	14,469	14,302	14,162	13,943	13,613	13,572	13,522	13,745	13,501	13,412	13,271	13,155	13,020	12,907
May	14,472	14,238	14,147	13,928	13,594	13,568	13,516	13,703	13,428	13,372	13,232	13,116	12,981	12,869
Jun	14,305	14,203	14,127	13,885	13,565	13,564	13,374	13,687	13,412	13,314	13,175	13,060	12,925	12,813
Jul	14,453	14,197	14,122	13,785	13,557	13,572	13,768	13,810	13,380	13,474	13,333	13,216	13,080	12,967
Aug	14,460	14,194	14,106	13,731	13,513	13,525	13,636	13,516	13,399	13,340	13,200	13,085	12,950	12,838
Sep	14,445	14,193	14,096	13,709	13,512	13,505	13,585	13,429	13,421	13,302	13,163	13,047	12,913	12,801
Oct	14,446	14,206	14,070	13,697	13,512	13,498	13,771	14,133	13,424	13,596	13,453	13,335	13,198	13,084
Nov	14,422	14,214	14,070	13,686	13,525	13,491	13,424	13,505	13,539	13,313	13,173	13,058	12,924	12,812
Dec	14,400	14,203	14,064	13,711	13,557	13,533	13,997	13,651	13,555	13,555	13,413	13,295	13.159	13,045
Ann	14,442	14,249	14,127	13,843	13,576	13,547	13,599	13,750	13,483	13,433	13,292	13,175	13,040	12,927
%	-0.1%	-1.3%	-0.9%	-2.0%	-1 9%	-0.2%	0.4%	1.1%	-1.9%	-0.4%	-1.0%	-0.9%	-1.0%	-0.9%

RES_SLS	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Jan	2,123,356	2,242,572	2,179,826	2,046,918	2,223,039	2,175,392	2,137,921	2,327,014	2,113,652	2,131,468	2,106,513	2,085,512	2,060,752	2,038,406
Feb	2,106,789	2,207,878	1,921,658	2,138,417	2,079,741	2,279,933	2,175,521	2,051,823	2,105,458	2,051,833	2,027,810	2,007,594	1,983,759	1,962,248
Mar	2,020,799	1,828.314	1,800,196	1,963,276	1,818,724	1,898,783	1,804,823	1,797,762	1,945,887	1,797,709	1,776,662	1,758,950	1,738,067	1,719,220
Apr	1,432,442	1,416,510	1,545,419	1,479,178	1,335,333	1,422,479	1,411,530	1,403,992	1,396,879	1,364,821	1,348,842	1,335,395	1,319,540	1,305,232
May	905,152	868,777	891,162	839,373	837,196	912,796	830,754	889,376	716,322	789,412	780,170	772,392	763,222	754,946
Jun	522,731	494.792	469,238	596,925	570,311	534,227	502,134	543,538	481,761	494,890	489,095	484,219	478,471	473,282
Jul	350,110	343,492	408,428	481,821	356,240	335,463	330,235	424,847	378,422	367,256	362,956	359,338	355,072	351,222
Aug	327,235	275,659	297,563	278,217	265,867	305,618	297,829	268,834	249,304	264,374	261,279	258,674	255,603	252,831
Sep	359,879	405,044	352,592	350,946	338,511	326,888	328,667	341,163	341,834	327,780	323,942	320,713	316,905	313,469
Oct	572,823	567,422	598,986	590,196	590,684	565,570	596,232	530,213	507,972	529,552	523,352	518,135	511,983	506,432
Nov	1,027,807	957,371	977,709	902,912	958,181	980,761	990,962	948,786	1,006,526	954,595	943,419	934,014	922,925	912,917
Dec	1,546,853	1,537,460	1,671,524	1,626,375	1,573,847	1,699,593	1,630,600	1,823,814	1,625,141	1,645,780	1,626,511	1,610,296	1,591,178	1,573,924
Ann	13,295,975	13,145,291	13,114,301	13,294,553	12,947,673	13,437,502	13,037,207	13,351,160	12,869,159	12,719,470	12,570,552	12,445,231	12,297,476	12,164,127
%	-3.5%	-1.1%	-0.2%	1.4%	-2.6%	3.8%	-3.0%	2.4%	-3.6%	-1.2%	-1.2%	-1.0%	-1.2%	-1.1%
Gas Yr	13,351,511	13,225,120	12,959,899	13,414,499	12,944,933	13,289,176	13,095,999	13,200,121	13,010,091	12,750,762	12,600,996	12,470,852	12,327,684	12,191,391
%	-3.9%	-0.9%	-2.0%	3.5%	-3.5%	2.7%	-1.5%	0.8%	-1.4%	-2.0%	-1.2%	-1.0%	-1.1%	-1.1%

Actuals thru Dec-1999. Historical Sales weather normalized.

Residential Class - Gas Marketing Customers and Therm Sales

RES_CUST	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Jan										9	115	220	325	428
Feb										17	123	229	334	437
Mar										27	132	238	343	445
Apr										36	141	246	351	454
May										44	150	255	360	462
Jun										53	159	264	368	471
Jul										62	167	272	376	478
Aug										70	176	281	384	487
Sep										79	184	289	394	496
Oct										89	193	299	402	504
Nov										97	202	307	412	514
Dec										106	211	316	420	522
Ann	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	57	163	268	372	475
%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	183.5%	64.7%	39.0%	27.5%

RES_SLS	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
										2875	20042	43888	67646	89345
Jan										5,872	24,924	49,370	73,219	95,110
Feb										7,533	25,127	46,119	66,139	84,622
Mar										7,669	22,111	38,249	53,204	67,034
Apr										6,353	16,620	27,447	37,057	45,916
May										5,906	14,406	22,906	30,065	36,672
Jun										6,119	14,151	21,793	27,880	33,542
Jul										5,200	11,513	17,222	21,605	25,753
Aug										6,341	13,523	19,662	24,400	28,985
Sep										9,972	20,613	29,239	35,946	42,543
Oct										15,956	32,134	44,618	54,352	64,042
Nov										29,057	57,264	78,068	94,161	110,347
Dec														
Ann	0	0	0	0	0	0	0	0	0	108853	272428	438581	585674	723911
%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	2	1	0	0

Table 2.28: Normal Firm Sendout Forecast by FT Scenario

MMBTU	*Firm Throughput Forecast*	*High FT*	*Base FT*	*Low FT*
		Normal Sendout Forecast by FT Scenario		
1999	2,228,609	2,151,044	2,151,044	2,151,044
2000	2,455,273	1,964,219	2,105,008	2,455,273
2001	2,534,904	1,520,942	2,046,534	2,534,904
2002	2,631,204	1,052,481	1,992,720	2,631,204
2003	2,709,098	541,820	1,916,258	2,709,098
2004	2,779,839	0	1,827,304	2,779,839
1999-2004	4.52%	-100.00%	-3.21%	5.26%

G. PLANNING STANDARDS AND DESIGN FORECASTS

The Company designs its gas supply portfolio to meet extreme cold weather conditions, as reflected in the Company's planning standards. FG&E established its planning standards by analyzing the differences in cost to supply forecasted firm throughput requirements under various design cold scenarios.

The process involved calculating the HDD associated with cold weather conditions of varying probabilities of occurrence. The base load and weather-sensitive components of firm system throughput were also calculated, then applied to the various design weather conditions to generate forecasts of firm throughput associated the different design conditions. This was done on a design cold year and design cold day basis. In establishing the planning standards, the FG&E took the conservative approach of showing how it would optimize its supply to meet the full requirements of firm throughput. That is, the analysis supporting the design standards did not take firm transport into consideration, or assumed it would be zero as in the Low FT Scenario. The analysis is presented in the Resource Assessment section.

GS1 (Heating Only) Class - Core Customers and Therm Sales

GS1_CUST	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Jan	935	956	964	954	963	940	970	987	962	1,004	1,007	1,008	1,009	1,010
Feb	940	958	963	956	959	953	976	1,022	954	1,015	1,018	1,020	1,021	1,021
Mar	938	954	965	952	956	953	964	975	960	997	1,000	1,001	1,002	1,003
Apr	940	952	960	949	947	950	968	969	958	996	998	1,000	1,001	1,002
May	938	953	954	946	944	953	967	945	966	990	992	994	995	995
Jun	939	949	949	950	938	952	931	875	988	961	963	965	966	966
Jul	940	946	948	947	936	942	935	773	995	930	932	934	935	935
Aug	939	945	945	942	935	941	930	694	1,015	908	910	912	913	913
Sep	941	946	945	935	937	939	969	953	1,017	1,011	1,013	1,015	1,016	1,017
Oct	942	953	946	935	936	948	995	1,019	1,002	1,037	1,040	1,042	1,043	1,043
Nov	942	958	947	943	935	952	944	967	998	1,000	1,003	1,005	1,006	1,006
Dec	952	962	954	952	944	961	969	987	992	1,014	1,017	1,018	1,019	1,020
Ann	941	953	953	947	944	949	960	930	984	988	991	993	994	994
%	1.2%	1.3%	0.1%	-0.7%	-0.3%	0.5%	1.2%	-3 1%	5.7%	0.4%	0.3%	0.2%	0.1%	0.1%

GS1_SLS	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Jan	850,285	890,720	721,667	863,281	924,604	922,595	1,001,603	998,891	880,793	967,543	980,137	998,207	1,014,182	1,031,236
Feb	772,177	809,503	590,049	779,127	867,090	945,864	924,150	834,410	943,328	907,300	919,110	936,055	951,036	967,028
Mar	684,270	666,741	832,442	741,496	668,283	774,976	740,347	740,686	792,825	763,567	773,506	787,767	800,374	813,833
Apr	386,239	421,915	439,512	442,290	450,998	503,648	496,591	426,711	442,053	458,489	464,457	473,020	480,590	488,671
May	244,080	186,970	181,916	214,642	232,639	237,768	220,664	217,421	186,010	209,572	212,300	216,214	219,675	223,369
Jun	77,668	92,652	89,036	101,829	128,355	106,639	103,791	132,493	111,477	116,779	118,299	120,480	122,408	124,466
Jul	55,731	55,261	50,295	51,546	59,728	58,590	55,875	122,789	50,473	76,945	77,946	79,383	80,654	82,010
Aug	57,725	55,463	56,846	52,681	49,035	59,327	58,854	35,429	60,338	51,922	52,598	53,568	54,425	55,340
Sep	62,042	79,399	75,766	69,001	110,015	74,293	79,757	56,530	92,947	76,977	77,979	79,417	80,688	82,045
Oct	161,607	154,370	175,743	157,079	204,618	161,853	197,755	161,551	184,253	182,528	184,904	188,313	191,327	194,544
Nov	333,171	383,464	350,544	328,141	529,934	373,677	389,303	371,326	403,997	391,084	396,175	403,479	409,936	416,829
Dec	614,706	727,750	686,802	620,174	721,406	731,495	708,437	833,244	856,561	805,335	815,818	830,858	844,155	858,350
Ann	4,299,700	4,524,209	4,250,619	4,421,286	4,946,702	4,950,726	4,977,128	4,931,480	5,005,053	5,008,042	5,073,230	5,166,762	5,249,449	5,337,720
%	-1.6%	5.2%	-6.0%	4.0%	11.9%	0.1%	0.5%	-0.9%	1.5%	0.1%	1.3%	1.8%	1.6%	1.7%
Gas Yr	4,287,295	4,360,873	4,324,487	4,510,317	4,643,678	5,096,893	4,984,561	4,824,649	4,949,066	5,072,179	5,057,655	5,144,417	5,229,696	5,316,633
%	-3.7%	1.7%	-0.8%	4.3%	3.0%	9.8%	-2.2%	-3.2%	2.6%	2.5%	-0.3%	1.7%	1.7%	1.7%

Actuals thru Dec-1999. Historical Sales weather normalized.

GS1 (Heating Only) Class - Gas Marketing Customers and Therm Sales

GS1_CUST	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Jan										2	20	39	58	74
Feb										3	22	41	59	76
Mar										5	23	42	60	77
Apr										6	25	44	62	79
May										8	27	46	64	81
Jun										10	30	50	69	86
Jul										11	32	52	70	87
Aug										13	34	54	72	89
Sep										15	35	55	73	90
Oct										17	36	55	72	89
Nov										18	37	56	73	90
Dec										19	38	57	73	90
Ann	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	11	30	49	67	84
%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	182.7%	64.6%	36.2%	25.2%

GS1_SLS	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Jan										4037	28313	62999	97858	125111
Feb										8,174	35,027	70,532	104,267	131,078
Mar										10,007	33,780	63,062	89,328	110,614
Apr										9,438	27,567	48,496	66,189	80,823
May										6,568	17,391	29,166	38,518	46,416
Jun										4,876	12,013	19,350	24,861	29,647
Jul										3,839	8,956	13,948	17,481	20,633
Aug										3,721	8,320	12,598	15,424	18,012
Sep										5,921	12,801	18,936	22,648	26,134
Oct										10,952	23,027	33,363	39,088	44,643
Nov										20,330	41,744	59,378	68,306	77,298
Dec										39,352	79,175	110,773	125,380	140,729
Ann	0	0	0	0	0	0	0	0	0	127215	328114	542601	709348	851138
%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	2	1	0	0

GS1 (Heating Only) Class - Total Customers and Therm Sales

GS1_CUST	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Jan	935	956	964	954	963	940	970	987	962	1,006	1,027	1,047	1,067	1,084
Feb	940	958	963	956	959	953	976	1,022	954	1,018	1,040	1,061	1,080	1,097
Mar	938	954	965	952	956	953	964	975	960	1,002	1,023	1,043	1,062	1,080
Apr	940	952	960	949	947	950	968	969	958	1,002	1,023	1,044	1,063	1,081
May	938	953	954	946	944	953	967	945	966	998	1,019	1,040	1,059	1,076
Jun	939	949	949	950	938	952	931	875	988	971	993	1,015	1,035	1,052
Jul	940	946	948	947	936	942	935	773	995	941	964	986	1,005	1,022
Aug	939	945	945	942	935	941	930	694	1,015	921	944	966	985	1,002
Sep	941	946	945	935	937	939	969	953	1,017	1,026	1,048	1,070	1,089	1,107
Oct	942	953	946	935	936	948	995	1,019	1,002	1,054	1,076	1,097	1,115	1,132
Nov	942	958	947	943	935	952	944	967	998	1,018	1,040	1,061	1,079	1,096
Dec	952	962	954	952	944	961	969	987	992	1,033	1,055	1,075	1,092	1,110
Ann	941	953	953	947	944	949	960	930	984	999	1,021	1,042	1,061	1,078
%	1.2%	1.3%	0.1%	-0.7%	-0.3%	0.5%	1.2%	-3.1%	5.7%	1.5%	2.2%	2.1%	1.8%	1.6%

GS1_SLS	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Jan	850,285	890,720	721,667	863,281	924,604	922,595	1,001,603	998,891	880,793	971,580	1,008,450	1,061,206	1,112,040	1,156,347
Feb	772,177	809,503	590,049	779,127	867,090	945,864	924,150	834,410	943,328	915,474	954,137	1,006,587	1,055,303	1,098,106
Mar	684,270	666,741	832,442	741,496	668,283	774,976	740,347	740,686	792,825	773,574	807,286	850,829	889,702	924,447
Apr	386,239	421,915	439,512	442,290	450,998	503,648	496,591	426,711	442,053	467,927	492,024	521,516	546,779	569,494
May	244,080	186,970	181,916	214,642	232,639	237,768	220,664	217,421	186,010	216,140	229,691	245,380	258,193	269,785
Jun	77,668	92,652	89,036	101,829	128,355	106,639	103,791	132,493	111,477	121,655	130,312	139,830	147,269	154,113
Jul	55,731	55,261	50,295	51,546	59,728	58,590	55,875	122,789	50,473	80,784	86,902	93,331	98,135	102,643
Aug	57,725	55,463	56,846	52,681	49,035	59,327	58,854	35,429	60,338	55,643	60,918	66,166	69,849	73,352
Sep	62,042	79,399	75,766	69,001	110,015	74,293	79,757	56,530	92,947	82,898	90,780	98,353	103,336	108,179
Oct	161,607	154,370	175,743	157,079	204,618	161,853	197,755	161,551	184,253	193,480	207,931	221,676	230,415	239,187
Nov	333,171	383,464	350,544	328,141	529,934	373,677	389,303	371,326	403,997	411,414	437,919	462,857	478,242	494,127
Dec	614,706	727,750	686,802	620,174	721,406	731,495	708,437	833,244	856,561	844,687	894,993	941,631	969,535	999,079
Ann	4,299,700	4,524,209	4,250,619	4,421,286	4,946,702	4,950,726	4,977,128	4,931,480	5,005,053	5,135,256	5,401,343	5,709,362	5,958,798	6,188,859
%	-1.6%	5.2%	-6.0%	4.0%	11.9%	0.1%	0.5%	-0.9%	1.5%	2.6%	5.2%	5.7%	4.4%	3.9%
Gas Yr	4,287,295	4,360,873	4,324,487	4,510,317	4,643,678	5,096,893	4,984,561	4,824,649	4,949,066	5,139,712	5,324,532	5,637,786	5,915,509	6,143,430
%	-3.7%	1.7%	-0.8%	4.3%	3.0%	9.8%	-2.2%	-3.2%	2.6%	3.9%	3.6%	5.9%	4.9%	3.9%

Actuals thru Dec-1999. Historical Sales weather normalized.

GS2 (Heating and Other) Class - Core Customers and Therm Sales

GS2_CUST	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Jan	351	351	339	345	341	323	353	387	377	380	385	387	390	391
Feb	352	345	339	342	334	339	351	419	373	389	394	396	399	400
Mar	351	341	342	337	334	340	353	365	377	373	377	379	382	383
Apr	352	340	339	336	334	341	353	353	375	368	372	375	377	379
May	352	339	337	336	332	342	352	362	365	367	372	374	376	378
Jun	351	336	338	338	332	342	312	363	335	344	348	350	352	354
Jul	350	338	341	339	330	339	349	330	344	348	352	355	357	358
Aug	350	339	341	336	329	347	344	316	326	336	340	342	344	346
Sep	350	342	341	335	328	350	347	354	329	351	355	357	359	361
Oct	352	340	342	336	331	349	352	371	341	362	366	369	371	373
Nov	353	339	343	341	334	349	360	356	362	367	371	374	376	378
Dec	352	339	345	340	337	348	392	374	375	389	393	396	398	400
Ann	351	341	341	338	333	342	352	363	357	365	369	371	373	375
%	1.2%	-3.0%	0.0%	-0.6%	-1.6%	2.8%	2.7%	3.1%	-1.6%	2.2%	1.1%	0.7%	0.6%	0.4%

GS2_SLS	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Jan	526,476	593,048	697,823	669,107	663,921	689,583	744,687	813,213	535,471	677,451	697,601	728,256	767,384	807,245
Feb	504,683	524,200	480,531	597,811	620,785	681,986	693,111	991,277	891,260	833,524	858,316	896,034	944,176	993,220
Mar	476,802	501,035	575,130	630,001	585,027	603,183	639,227	659,232	677,519	639,460	658,480	687,417	724,350	761,975
Apr	352,453	369,762	445,541	438,296	439,580	488,193	516,510	514,968	526,866	504,307	519,307	542,128	571,255	600,928
May	268,014	280,621	306,061	324,829	366,857	369,090	387,832	433,724	355,831	381,023	392,356	409,598	431,604	454,024
Jun	240,291	237,531	297,538	314,008	296,435	282,266	298,058	386,026	366,047	339,840	349,949	365,327	384,955	404,951
Jul	182,868	204,247	249,642	240,183	235,951	275,878	304,066	386,790	325,091	328,778	338,557	353,434	372,424	391,769
Aug	238,921	231,365	296,850	246,596	295,155	277,367	264,322	276,482	304,898	273,684	281,824	294,208	310,016	326,119
Sep	213,561	239,280	318,427	289,674	321,646	321,232	315,470	411,563	314,431	337,035	347,060	362,311	381,778	401,608
Oct	283,377	320,245	377,846	339,014	322,929	385,494	766,837	369,815	261,088	452,333	465,787	486,255	512,381	538,995
Nov	341,863	371,497	454,990	499,069	440,563	453,227	467,513	386,934	591,610	467,969	481,888	503,064	530,093	557,628
Dec	445,736	548,929	557,791	578,006	541,222	629,059	661,857	701,385	779,538	693,440	714,066	745,445	785,496	826,297
Ann	4,075,044	4,421,761	5,058,170	5,166,594	5,130,070	5,456,556	6,059,491	6,331,408	5,929,650	5,928,845	6,105,191	6,373,477	6,715,912	7,064,760
%	15.0%	8.5%	14.4%	2.1%	-0.7%	6.4%	11.0%	4.5%	-6.3%	0.0%	3.0%	4.4%	5.4%	5.2%
Gas Yr	4,116,224	4,288,933	4,965,816	5,102,300	5,225,361	5,356,056	6,012,406	6,372,459	5,646,821	6,138,583	6,070,646	6,320,922	6,648,832	6,996,423
%	17.2%	4.2%	15.8%	2.7%	2.4%	2.5%	12.3%	6.0%	-11.4%	8.7%	-1.1%	4.1%	5.2%	5.2%

Actuals thru Dec-1999. Historical Sales weather normalized.

GS2 (Heating and Other) Class - Gas Marketing Customers and Therm Sales

GS2_CUST	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Jan										0	7	16	25	31
Feb										2	9	18	26	32
Mar										2	9	18	27	33
Apr										2	9	18	27	33
May										3	11	19	27	33
Jun										4	10	18	25	31
Jul										4	10	19	26	31
Aug										4	11	19	26	31
Sep										5	12	20	27	33
Oct										6	13	21	29	34
Nov										7	15	24	30	36
Dec										7	16	25	31	38
Ann	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	4	11	20	27	33
%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	187.0%	78.0%	38.7%	21.5%

GS2_SLS	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Jan										7811	54934	123089	191739	241734
Feb										15,546	66,923	135,703	200,272	248,144
Mar										19,920	67,638	127,206	179,158	218,477
Apr										19,270	56,667	100,470	135,837	163,215
May										14,083	37,567	63,511	82,843	98,205
Jun										11,587	28,804	46,833	59,151	69,207
Jul										11,261	26,522	41,716	51,235	59,276
Aug										9,597	21,672	33,159	39,665	45,352
Sep										13,916	30,368	45,356	53,012	59,989
Oct										24,644	52,286	76,471	87,501	98,046
Nov										41,612	86,240	123,856	138,908	154,129
Dec										78,713	159,888	225,933	248,839	273,627
Ann	0	0	0	0	0	0	0	0	0	267960	689509	1143303	1468160	1729401
%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	2	1	0	0

GS2 (Heating and Other) Class - Total Customers and Therm Sales

GS2_CUST	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Jan	351	351	339	345	341	323	353	387	377	380	392	403	415	422
Feb	352	345	339	342	334	339	351	419	373	391	403	414	425	432
Mar	351	341	342	337	334	340	353	365	377	375	386	397	409	416
Apr	352	340	339	336	334	341	353	353	375	370	381	393	404	412
May	352	339	337	336	332	342	352	362	365	370	383	393	403	411
Jun	351	336	338	338	332	342	312	363	335	348	358	368	377	385
Jul	350	338	341	339	330	339	349	330	344	352	362	374	383	389
Aug	350	339	341	336	329	347	344	316	326	340	351	361	370	377
Sep	350	342	341	335	328	350	347	354	329	356	367	377	386	394
Oct	352	340	342	336	331	349	352	371	341	368	379	390	400	407
Nov	353	339	343	341	334	349	360	356	362	374	386	398	406	414
Dec	352	339	345	340	337	348	392	374	375	396	409	421	429	438
Ann	351	341	341	338	333	342	352	363	357	368	380	391	401	408
%	1.2%	-3.0%	0.0%	-0.6%	-1.6%	2.8%	2.7%	3.1%	-1.6%	3.3%	3.1%	2.9%	2.5%	1.9%

GS2_SLS	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Jan	526,476	593,048	697,823	669,107	663,921	689,583	744,687	813,213	535,471	685,262	752,535	851,345	959,123	1,048,979
Feb	504,683	524,200	480,531	597,811	620,785	681,986	693,111	991,277	891,260	849,070	925,239	1,031,737	1,144,448	1,241,364
Mar	476,802	501,035	575,130	630,001	585,027	603,183	639,227	659,232	677,519	659,380	726,118	814,623	903,508	980,452
Apr	352,453	369,762	445,541	438,296	439,580	488,193	516,510	514,968	526,866	523,577	575,974	642,598	707,092	764,143
May	268,014	280,621	306,061	324,829	366,857	369,090	387,832	433,724	355,831	395,106	429,923	473,109	514,447	552,229
Jun	240,291	237,531	297,538	314,008	296,435	282,266	298,058	386,026	366,047	351,427	378,753	412,160	444,106	474,158
Jul	182,868	204,247	249,642	240,183	235,951	275,878	304,066	386,790	325,091	340,039	365,079	395,150	423,659	451,045
Aug	238,921	231,365	296,850	246,596	295,155	277,367	264,322	276,482	304,898	283,281	303,496	327,367	349,681	371,471
Sep	213,561	239,280	318,427	289,674	321,646	321,232	315,470	411,563	314,431	350,951	377,428	407,667	434,790	461,597
Oct	283,377	320,245	377,846	339,014	322,929	385,494	766,837	369,815	261,088	476,977	518,073	562,726	599,882	637,041
Nov	341,863	371,497	454,990	499,069	440,563	453,227	467,513	386,934	591,610	509,581	568,128	626,920	669,001	711,757
Dec	445,736	548,929	557,791	578,006	541,222	629,059	661,857	701,385	779,538	772,153	873,954	971,378	1,034,335	1,099,924
Ann	4,075,044	4,421,761	5,058,170	5,166,594	5,130,070	5,456,556	6,059,491	6,331,408	5,929,650	6,196,804	6,794,700	7,516,780	8,184,072	8,794,160
%	15.0%	8.5%	14.4%	2.1%	-0.7%	6.4%	11.0%	4.5%	-6.3%	4.5%	9.6%	10.6%	8.9%	7.5%
Gas Yr	4,116,224	4,288,933	4,965,816	5,102,300	5,225,361	5,356,056	6,012,406	6,372,459	5,646,821	6,286,218	6,634,352	7,360,564	8,079,034	8,685,815
%	17.2%	4.2%	15.8%	2.7%	2.4%	2.5%	12.3%	6.0%	-11.4%	11.3%	5.5%	10.9%	9.8%	7.5%

Actuals thru Dec-1999. Historical Sales weather normalized.

Total Company - Core Firm Customers and Therm Sales

CORE_CUST	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Jan	15,767	15,694	15,498	15,371	15,010	14,842	14,860	15,206	14,921	14,856	14,722	14,609	14,477	14,366
Feb	15,773	15,641	15,486	15,297	14,940	14,865	14,862	15,551	14,911	14,967	14,833	14,720	14,587	14,474
Mar	15,763	15,602	15,485	15,253	14,906	14,872	14,837	15,217	14,911	14,848	14,714	14,600	14,469	14,357
Apr	15.761	15,594	15,461	15,228	14,894	14,863	14,843	15,067	14,835	14,776	14,641	14,530	14,398	14,288
May	15,762	15,530	15,438	15,210	14,870	14,863	14,835	15,010	14,759	14,729	14,596	14,484	14,352	14,242
Jun	15,595	15,488	15,414	15,173	14,835	14,858	14,617	14,925	14,735	14,619	14,486	14,375	14,243	14,133
Jul	15,743	15,481	15,411	15,071	14,823	14,853	15,052	14,913	14,720	14,752	14,617	14,505	14,372	14,260
Aug	15,749	15,478	15,392	15,009	14,777	14,813	14,910	14,526	14,741	14,584	14,450	14,339	14,207	14,097
Sep	15,736	15,481	15,382	14,979	14,777	14,794	14,901	14,736	14,767	14,664	14,531	14,419	14,288	14,179
Oct	15,740	15,499	15,358	14,968	14,779	14,795	15,118	15,523	14,767	14,995	14,859	14,746	14,612	14,500
Nov	15,717	15,511	15,360	14,970	14,794	14,792	14,728	14,828	14,900	14,680	14,547	14,437	14,306	14,196
Dec	15,704	15,504	15,363	15,003	14,838	14,842	15,358	15.012	14,923	14,958	14,823	14.709	14,576	14.465
Ann	15,734	15,542	15,421	15,128	14,854	14,838	14,910	15,043	14,824	14,786	14,652	14,539	14,407	14,296
%	0.0%	-1.2%	-0.8%	-1.9%	-1.8%	-0.1%	0.5%	0.9%	-1.5%	-0.3%	-0.9%	-0.8%	-0.9%	-0.8%

CORE_SLS	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Jan	3,500,117	3,726,340	3,599,316	3,579,306	3,811,563	3,787,569	3,884,211	4,139,118	3,529,917	3,776,462	3,784,251	3,811,975	3,842,318	3,876,887
Feb	3,383,649	3,541,582	2,992,238	3,515,355	3,567,615	3,907,782	3,792,782	3,877,509	3,940,046	3,792,657	3,805,236	3,839,683	3,878,971	3,922,496
Mar	3,181,871	2,996,089	3,207,768	3,334,772	3,072,033	3,276,942	3,184,397	3,197,680	3,416,231	3,200,736	3,208,648	3,234,134	3,262,791	3,295,028
Apr	2,171,134	2.208,187	2,430,473	2,359,763	2,225,910	2,414,320	2,424,631	2,345,671	2,365,798	2,327,617	2,332,606	2,350,543	2,371,385	2,394,831
May	1,417,245	1,336,368	1,379,139	1,378,843	1,436,692	1,519,654	1,439,251	1,540,520	1,258,163	1,380,007	1,384,826	1,398,204	1,414,501	1,432,339
Jun	840,690	824,975	855,812	1,012,762	995,101	923,132	903,983	1,062,056	959,285	951,509	957,343	970,026	985,834	1,002,699
Jul	588,709	603,000	708,365	773,550	651,919	669,930	690,176	934,426	753,986	772,979	779,459	792,155	808,150	825,001
Aug	623,881	562,487	651,259	577,495	610,057	642,312	621,005	580,744	614,540	589,980	595,701	606,450	620,044	634,290
Sep	635,482	723,723	746,786	709,620	770,172	722,413	723,894	809,256	749,212	741,792	748,981	762,441	779,371	797,122
Oct	1,017,807	1,042,037	1,152,575	1,086,289	1,118,231	1,112,918	1,560,823	1,061,579	953,312	1,164,413	1,174,043	1,192,703	1,215,691	1,239,971
Nov	1,702,841	1,712,332	1,783,242	1,730,122	1,928,677	1,807,665	1,847,778	1,707,046	2,002,133	1,813,648	1,821,482	1,840,557	1,862,954	1,887,374
Dec	2,607,295	2,814,140	2,916,117	2,824,556	2,836,475	3,060,147	3,000,894	3,358,442	3,261,239	3,144,555	3,156,395	3,186,599	3,220,829	3,258,571
Ann	21,670,719	22,091,261	22,423,090	22,882,434	23,024,446	23,844,784	24,073,825	24,614,047	23,803,862	23,656,355	23,748,971	23,985,470	24,262,839	24,566,609
%	-0.1%	1.9%	1.5%	2.0%	0.6%	3.6%	1.0%	2.2%	-3.3%	-0.6%	0.4%	1.0%	1.2%	1.3%
Gas Yr	21,755,030	21,874,926	22,250,202	23,027,116	22,813,971	23,742,125	24,092,965	24,397,230	23,605,979	23,961,524	23,729,297	23,936,191	24,206,212	24,504,447
%	-0.4%	0.6%	1.7%	3.5%	-0.9%	4.1%	1.5%	1.3%	-3.2%	1.5%	-1.0%	0.9%	1.1%	1.2%

Actuals thru Dec-1999. Historical Sales weather normalized.

Total Company - Gas Marketing Customers and Therm Sales

MKT_CUST	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Jan	0	0	0	0	0	0	0	0	0	11	142	275	408	533
Feb	0	0	0	0	0	0	0	0	0	22	154	288	419	545
Mar	0	0	0	0	0	0	0	0	0	34	164	298	430	555
Apr	0	0	0	0	0	0	0	0	0	44	175	308	440	566
May	0	0	0	0	0	0	0	0	0	55	188	320	451	576
Jun	0	0	0	0	0	0	0	0	0	67	199	332	462	588
Jul	0	0	0	0	0	0	0	0	0	77	209	343	472	596
Aug	0	0	0	0	0	0	0	0	0	87	221	354	482	607
Sep	0	0	0	0	0	0	0	0	0	99	231	364	494	619
Oct	0	0	0	0	0	0	0	0	0	112	242	375	503	627
Nov	0	0	0	0	0	0	0	0	0	122	254	387	515	640
Dec	0	0	0	0	0	0	0	0	0	132	265	398	524	650
Ann	0	0	0	0	0	0	0	0	0	72	204	337	467	592
%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	183.5%	65.4%	38.5%	26.8%

MKT_SLS	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Jan	0	0	0	0	0	0	0	0	0	14723	103289	229976	357243	456190
Feb	0	0	0	0	0	0	0	0	0	29,592	126,874	255,605	377,758	474,332
Mar	0	0	0	0	0	0	0	0	0	37,460	126,545	236,387	334,625	413,713
Apr	0	0	0	0	0	0	0	0	0	36,377	106,345	187,215	255,230	311,072
May	0	0	0	0	0	0	0	0	0	27,004	71,578	120,124	158,418	190,537
Jun	0	0	0	0	0	0	0	0	0	22,369	55,223	89,089	114,077	135,526
Jul	0	0	0	0	0	0	0	0	0	21,219	49,629	77,457	96,596	113,451
Aug	0	0	0	0	0	0	0	0	0	18,518	41,505	62,979	76,694	89,117
Sep	0	0	0	0	0	0	0	0	0	26,178	56,692	83,954	100,060	115,108
Oct	0	0	0	0	0	0	0	0	0	45,568	95,926	139,073	162,535	185,232
Nov	0	0	0	0	0	0	0	0	0	77,898	160,118	227,852	261,566	295,469
Dec	0	0	0	0	0	0	0	0	0	147,122	296,327	414,774	468,380	524,703
Ann	0	0	0	0	0	0	0	0	0	504028	1290051	2124485	2763182	3304450
%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	2	1	0	0

Demand Forecast - Total Company Firm Customers and Therm Sales

TOT_CUST	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Jan	15,767	15,694	15,498	15,371	15,010	14,842	14,860	15,206	14,921	14,867	14,864	14,884	14,885	14,899
Feb	15,773	15,641	15,486	15,297	14,940	14,865	14,862	15,551	14,911	14,989	14,987	15,008	15,006	15,019
Mar	15,763	15,602	15,485	15,253	14,906	14,872	14,837	15,217	14,911	14,882	14,878	14,898	14,899	14,912
Apr	15,761	15,594	15,461	15,228	14,894	14,863	14,843	15,067	14,835	14,820	14,816	14,838	14,838	14,854
May	15,762	15,530	15,438	15,210	14,870	14,863	14,835	15,010	14,759	14,784	14,784	14,804	14,803	14,818
Jun	15,595	15,488	15,414	15,173	14,835	14,858	14,617	14,925	14,735	14,686	14,685	14,707	14,705	14,721
Jul	15,743	15,481	15,411	15,071	14,823	14,853	15,052	14,913	14,720	14,829	14,826	14,848	14,844	14,856
Aug	15,749	15,478	15,392	15,009	14,777	14,813	14,910	14,526	14,741	14,671	14,671	14,693	14,689	14,704
Sep	15,736	15,481	15,382	14,979	14,777	14,794	14,901	14,736	14,767	14,763	14,762	14,783	14,782	14,798
Oct	15,740	15,499	15,358	14,968	14,779	14,795	15,118	15,523	14,767	15,107	15,101	15,121	15,115	15,127
Nov	15,717	15,511	15,360	14,970	14,794	14,792	14,728	14,828	14,900	14,802	14,801	14,824	14,821	14,836
Dec	15,704	15,504	15,363	15,003	14,838	14,842	15,358	15,012	14,923	15,090	15,088	15,107	15,100	15,115
Ann	15,734	15,542	15,421	15,128	14,854	14,838	14,910	15,043	14,824	14,858	14,855	14,876	14,874	14,888
%	0.0%	-1.2%	-0.8%	-1.9%	-1.8%	-0.1%	0.5%	0.9%	-1.5%	0.2%	0.0%	0.1%	0.0%	0.1%

TOT_SLS	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Jan	3,500,117	3,726,340	3,599,316	3,579,306	3,811,563	3,787,569	3,884,211	4,139,118	3,529,917	3,791,185	3,887,540	4,041,951	4,199,561	4,333,077
Feb	3,383,649	3,541,582	2,992,238	3,515,355	3,567,615	3,907,782	3,792,782	3,877,509	3,940,046	3,822,249	3,932,110	4,095,288	4,256,729	4,396,828
Mar	3,181,871	2,996,089	3,207,768	3,334,772	3,072,033	3,276,942	3,184,397	3,197,680	3,416,231	3,238,196	3,335,193	3,470,521	3,597,416	3,708,741
Apr	2,171,134	2,208,187	2,430,473	2,359,763	2,225,910	2,414,320	2,424,631	2,345,671	2,365,798	2,363,994	2,438,951	2,537,758	2,626,615	2,705,903
May	1,417,245	1,336,368	1,379,139	1,378,843	1,436,692	1,519,654	1,439,251	1,540,520	1,258,163	1,407,011	1,456,404	1,518,328	1,572,919	1,622,876
Jun	840,690	824,975	855,812	1,012,762	995,101	923,132	903,983	1,062,056	959,285	973,878	1,012,566	1,059,115	1,099,911	1,138,225
Jul	588,709	603,000	708,365	773,550	651,919	669,930	690,176	934,426	753,986	794,198	829,088	869,612	904,746	938,452
Aug	623,881	562,487	651,259	577,495	610,057	642,312	621,005	580,744	614,540	608,498	637,206	669,429	696,738	723,407
Sep	635,482	723,723	746,786	709,620	770,172	722,413	723,894	809,256	749,212	767,970	805,673	846,395	879,431	912,230
Oct	1,017,807	1,042,037	1,152,575	1,086,289	1,118,231	1,112,918	1,560,823	1,061,579	953,312	1,209,981	1,269,969	1,331,776	1,378,226	1,425,203
Nov	1,702,841	1,712,332	1,783,242	1,730,122	1,928,677	1,807,665	1,847,778	1,707,046	2,002,133	1,891,546	1,981,600	2,068,409	2,124,520	2,182,843
Dec	2,607,295	2,814,140	2,916,117	2,824,556	2,836,475	3,060,147	3,000,894	3,358,442	3,261,239	3,291,677	3,452,722	3,601,373	3,689,209	3,783,274
Ann	21,670,719	22,091,261	22,423,090	22,882,434	23,024,446	23,844,784	24,073,825	24,614,047	23,803,862	24,160,383	25,039,022	26,109,955	27,026,021	27,871,059
%	-0.1%	1.9%	1.5%	2.0%	0.6%	3.6%	1.0%	2.2%	-3.3%	1.5%	3.6%	4.3%	3.5%	3.1%
Gas Yr	21,755,030	21,874,926	22,250,202	23,027,116	22,813,971	23,742,125	24,092,965	24,397,230	23,605,979	24,240,532	24,787,923	25,874,495	26,882,074	27,718,671
%	-0.4%	0.6%	1.7%	3.5%	-0.9%	4.1%	1.5%	1.3%	-3.2%	2.7%	2.3%	4.4%	3.9%	3.1%

Actuals thru Dec-1999. Historical Sales weather normalized.

Firm Delivery and Firm Throughput Forecasts (MMBTU)

DELIVERY	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Jan	350,012	372,634	359,932	357,931	381,156	378,757	388,421	413,912	352,992	379,119	388,754	404,195	419,956	433,308
Feb	338,365	354,158	299,224	351,536	356,761	390,778	379,278	387,751	394,005	382,225	393,211	409,529	425,673	439,683
Mar	318,187	299,609	320,777	333,477	307,203	327,694	318,440	319,768	341,623	323,820	333,519	347,052	359,742	370,874
Apr	217,113	220,819	243,047	235,976	222,591	241,432	242,463	234,567	236,580	236,399	243,895	253,776	262,662	270,590
May	141,724	133,637	137,914	137,884	143,669	151,965	143,925	154,052	125,816	140,701	145,640	151,833	157,292	162,288
Jun	84,069	82,498	85,581	101,276	99,510	92,313	90,398	106,206	95,929	97,388	101,257	105,912	109,991	113,823
Jul	58,871	60,300	70,837	77,355	65,192	66,993	69,018	93,443	75,399	79,420	82,909	86,961	90,475	93,845
Aug	62,388	56,249	65,126	57,749	61,006	64,231	62,100	58,074	61,454	60,850	63,721	66,943	69,674	72,341
Sep	63,548	72,372	74,679	70,962	77,017	72,241	72,389	80,926	74,921	76,797	80,567	84,640	87,943	91,223
Oct	101,781	104,204	115,258	108,629	111,823	111,292	156,082	106,158	95,331	120,998	126,997	133,178	137,823	142,520
Nov	170,284	171,233	178,324	173,012	192,868	180,767	184,778	170,705	200,213	189,155	198,160	206,841	212,452	218,284
Dec	260,730	281,414	291,612	282,456	283,648	306,015	300,089	335,844	326,124	329,168	345,272	360,137	368,921	378,327
Ann	2,167,072	2,209,126	2,242,309	2,288,243	2,302,445	2,384,478	2,407,382	2,461,405	2,380,386	2,416,038	2,503,902	2,610,996	2,702,602	2,787,106
%	-0.1%	1.9%	1.5%	2.0%	0.6%	3.6%	1.0%	2.2%	-3.3%	1.5%	3.6%	4.3%	3.5%	3.1%
Gas Yr	2,175,503	2,187,493	2,225,020	2,302,712	2,281,397	2,374,212	2,409,297	2,439,723	2,360,598	2,424,053	2,478,792	2,587,450	2,688,207	2,771,867
%	-0.4%	0.6%	1.7%	3.5%	-0.9%	4.1%	1.5%	1.3%	-3.2%	2.7%	2.3%	4.4%	3.9%	3.1%

THRU-PUT	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Jan	368,931	384,926	370,362	407,765	389,905	398,349	411,675	399,025	417,199	388,117	396,077	409,828	423,752	435,101
Feb	318,919	331,293	330,754	345,478	341,732	353,699	339,411	337,171	340,218	354,136	362,388	375,420	388,134	398,755
Mar	281,188	292,427	288,556	297,241	287,569	305,388	307,894	312,056	358,242	303,180	310,628	321,531	331,525	339,967
Apr	173,252	174,578	192,580	184,865	186,062	199,976	192,448	187,182	179,385	185,758	190,453	196,925	202,533	207,322
May	111,605	100,718	102,816	117,316	119,169	114,703	117,383	120,954	106,157	112,086	115,307	119,466	122,990	126,102
Jun	77,705	73,100	79,547	80,406	74,786	71,240	79,489	83,911	72,782	80,280	82,973	86,268	89,052	91,597
Jul	63,275	65,845	65,547	63,604	64,188	63,698	69,404	73,100	65,313	79,023	82,088	85,674	88,693	91,537
Aug	69,192	73,441	68,070	68,686	69,421	66,418	74,267	70,567	70,717	70,073	73,067	76,434	79,211	81,888
Sep	80,613	80,079	87,363	84,502	85,268	83,907	89,022	87,145	79,447	90,939	95,009	99,397	102,846	106,234
Oct	161,302	136,508	157,921	146,707	154,451	151,425	169,056	152,543	161,268	166,789	174,436	182,273	187,955	193,663
Nov	223,597	217,060	236,434	235,837	249,510	246,313	252,311	241,738	247,441	246,514	257,280	267,537	273,754	280,200
Dec	333,668	330,023	337,118	341,776	352,116	343,805	364,555	344,615	356,464	378,379	395,199	410,450	418,653	427,474
Ann	2,263,247	2,259,997	2,317,068	2,374,182	2,374,177	2,398,923	2,466,916	2,410,005	2,454,633	2,455,273	2,534,904	2,631,204	2,709,098	2,779,839
%	1.1%	-0.1%	2.5%	2.5%	0.0%	1.0%	2.8%	-2.3%	1.9%	0.0%	3.2%	3.8%	3.0%	2.6%
Gas Yr	2,253,303	2,270,179	2,290,599	2,370,121	2,350,163	2,410,432	2,440,168	2,440,519	2,437,081	2,434,285	2,507,318	2,605,696	2,694,678	2,764,572
%	-0.9%	0.7%	0.9%	3.5%	-0.8%	2.6%	1.2%	0.0%	-0.1%	-0.1%	3.0%	3.9%	3.4%	2.6%

Actuals thru Dec-1999. Historical values weather normalized.

Firm Transport and Firm Sendout Forecasts (MMBTU)

TRANSPORT	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Jan	0	0	0	0	0	0	0	0	0	55,368	76,307	99,448	124,014	149,091
Feb	0	0	0	0	0	0	0	0	0	50,520	69,817	91,099	113,591	136,637
Mar	0	0	0	0	0	0	0	0	0	43,251	59,845	78,022	97,024	116,493
Apr	0	0	0	0	0	0	0	0	0	26,500	36,692	47,786	59,273	71,040
May	0	0	0	0	0	0	0	0	0	15,990	22,215	28,989	35,994	43,210
Jun	0	0	0	0	0	0	0	0	0	11,453	15,985	20,934	26,062	31,386
Jul	0	0	0	0	0	0	0	0	0	11,273	15,815	20,790	25,957	31,366
Aug	0	0	0	0	0	0	0	0	0	9,997	14,077	18,547	23,182	28,060
Sep	0	0	0	0	0	0	0	0	0	12,973	18,304	24,119	30,099	36,402
Oct	0	0	0	0	0	0	0	0	0	23,794	33,606	44,230	55,007	66,360
Nov	0	0	0	0	0	0	0	0	37,738	35,167	49,567	64,920	80,116	96,013
Dec	0	0	0	0	0	0	0	0	39,827	53,979	76,138	99,599	122,522	146,477
Ann	0	0	0	0	0	0	0	0	77,565	350,265	488,370	638,483	792,840	952,535
%	NA	NA	NA	NA	NA	NA	NA	NA	NA	351.6%	39.4%	30.7%	24.2%	20.1%
Gas Yr	0	0	0	0	0	0	0	0	0	338,684	451,811	599,670	754,720	912,683
%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	33.4%	32.7%	25.9%	20.9%

SEND OUT	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Jan	368,931	384,926	370,362	407,765	389,905	398,349	411,675	399,025	417,199	332,749	319,769	310,380	299,737	286,010
Feb	318,919	331,293	330,754	345,478	341,732	353,699	339,411	337,171	340,218	303,615	292,571	284,321	274,544	262,118
Mar	281,188	292,427	288,556	297,241	287,569	305,388	307,894	312,056	358,242	259,929	250,783	243,509	234,502	223,475
Apr	173,252	174,578	192,580	184,865	186,062	199,976	192,448	187,182	179,385	159,258	153,760	149,140	143,260	136,281
May	111,605	100,718	102,816	117,316	119,169	114,703	117,383	120,954	106,157	96,096	93,092	90,476	86,996	82,892
Jun	77,705	73,100	79,547	80,406	74,786	71,240	79,489	83,911	72,782	68,827	66,987	65,334	62,990	60,210
Jul	63,275	65,845	65,547	63,604	64,188	63,698	69,404	73,100	65,313	67,749	66,273	64,885	62,736	60,171
Aug	69,192	73,441	68,070	68,686	69,421	66,418	74,267	70,567	70,717	60,077	58,990	57,887	56,029	53,829
Sep	80,613	80,079	87,363	84,502	85,268	83,907	89,022	87,145	79,447	77,966	76,705	75,277	72,747	69,832
Oct	161,302	136,508	157,921	146,707	154,451	151,425	169,056	152,543	161,268	142,995	140,829	138,043	132,948	127,303
Nov	223,597	217,060	236,434	235,837	249,510	246,313	252,311	241,738	209,703	211,347	207,713	202,617	193,638	184,187
Dec	333,668	330,023	337,118	341,776	352,116	343,805	364,555	344,615	316,637	324,400	319,061	310,851	296,131	280,996
Ann	2,263,247	2,259,997	2,317,068	2,374,182	2,374,177	2,398,923	2,466,916	2,410,005	2,377,069	2,105,008	2,046,534	1,992,720	1,916,258	1,827,304
%	1.1%	-0.1%	2.5%	2.5%	0.0%	1.0%	2.8%	-2.3%	-1.4%	-11.4%	-2.8%	-2.6%	-3.8%	-4.6%
Gas Yr	2,253,303	2,270,179	2,290,599	2,370,121	2,350,163	2,410,432	2,440,168	2,440,519	2,437,081	2,095,601	2,055,507	2,006,026	1,939,957	1,851,889
%	-0.9%	0.7%	0.9%	3.5%	-0.8%	2.6%	1.2%	0.0%	-0.1%	-14.0%	-1.9%	-2.4%	-3.3%	-4.5%

Actuals thru Dec-1999. Historical values weather normalized.